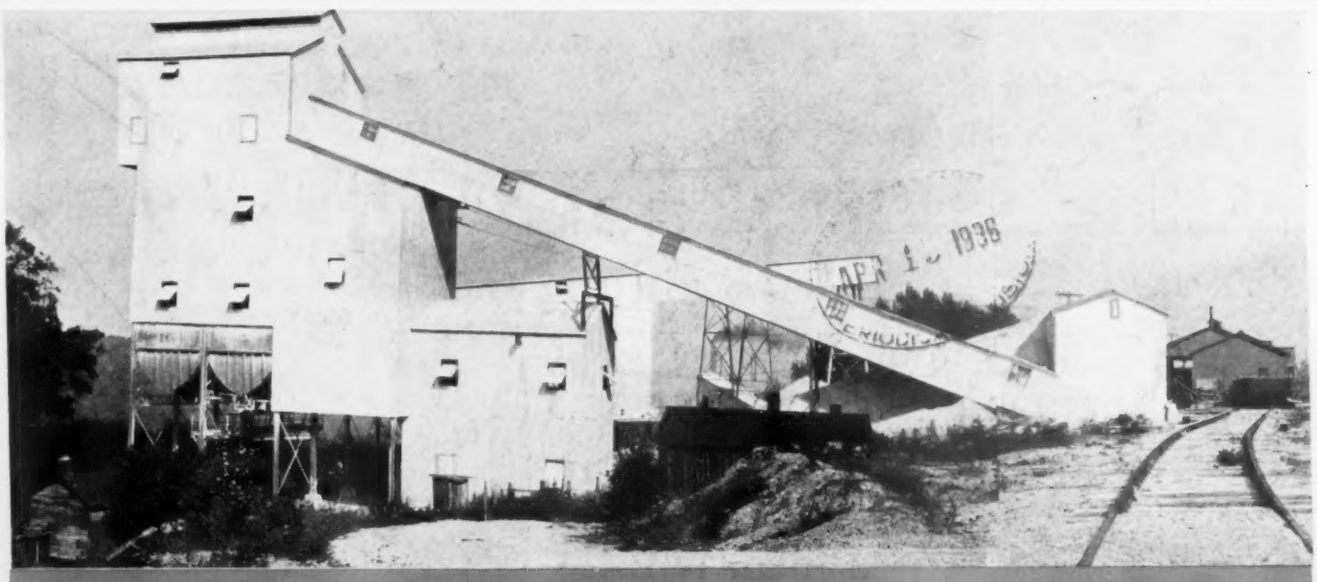
NRA
CODE
GRAPHIC ARTS INDUSTRY
1934

Pit and Quarry

With which is consolidated
CEMENT-MILL & QUARRY

June, 1935



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★In the Republic Organization, no problems receive closer attention to detail than the specifications and manufacture of Conveyor Belting to meet known conditions. Our engineers analyze every requirement based on quantity and type of material to be handled, and such factors as length, elevation, width, means of loading and discharge, design of feed, type of drive, tension, alignment, housing and exposure, etc.

Lowest cost per ton is the aim in every case. As a result of painstaking care in meeting the special needs of application, Republic Conveyor Belting enjoys an outstanding reputation among aggregates producers.

Let us make a thorough study of your individual requirements and submit specifications for attaining the most efficient performance.

★

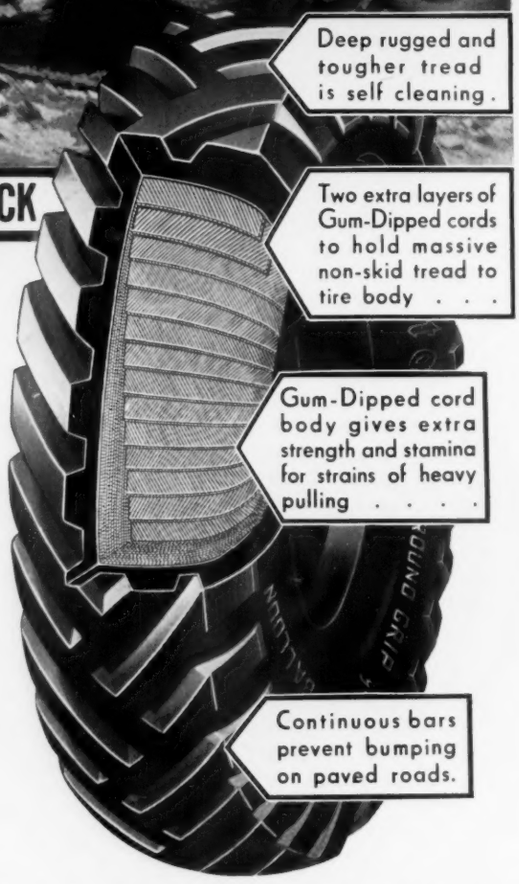
Pages 21-25

THE REPUBLIC RUBBER CO.
YOUNGSTOWN, OHIO

MECHANICAL RUBBER PRODUCTS FOR EVERY INDUSTRIAL REQUIREMENT

ORDER REPUBLIC RUBBER PRODUCTS FROM YOUR DISTRIBUTOR

IN DEEP MUD - BROKEN GROUND - CRUSHED ROCK


Deep rugged and tougher tread is self cleaning.
Two extra layers of Gum-Dipped cords to hold massive non-skid tread to tire body . . .
Gum-Dipped cord body gives extra strength and stamina for strains of heavy pulling . . . .
Continuous bars prevent bumping on paved roads.

THIS NEW

GROUND GRIP TIRE

WILL PULL YOUR EQUIPMENT THROUGH

THE new Firestone Ground Grip Tire, built with a deep, thick, rugged tread, with widely spaced, self-cleaning bars of a new and tougher tread rubber, provides super-traction to move heavy loads. That's why this new tire makes its own road!

This big rugged tread, containing 54% more rubber, is held securely to the Gum-Dipped Cord body, because between the tread and the body there are two extra layers of Gum-Dipped High Stretch Cords, making a single unit of great strength. This is a patented Firestone construction feature.

The new line of Firestone Ground Grip Tires includes sizes and types for your trucks, cars, and tractors. See your nearest Firestone Service Store or Firestone Tire Dealer today. Let him tell you how these exclusive Firestone construction features enable you to make more trips—do more work and give you more dependable and economical service.

★★★★★ *Listen to the Voice of Firestone—featuring Richard Crooks, Gladys Swarthout, Nelson Eddy, or Margaret Speaks—every Monday night over N. B. C.—WEAF Network . . . . A Five Star Program*

AUTO SUPPLIES AT BIG SAVINGS

TRUCK TYPE BATTERIES

SPARK PLUGS

BRAKE LINING

Firestone

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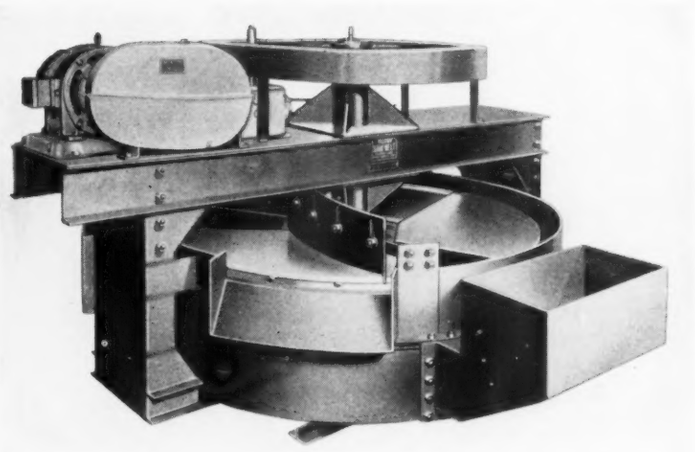
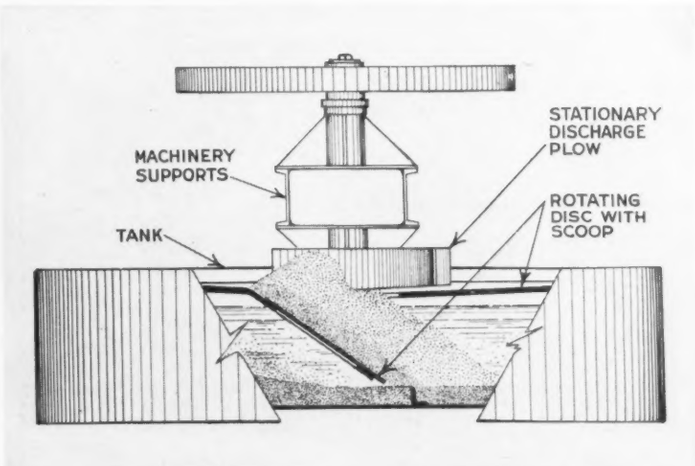
ANNOUNCING THE LINK-BELT DEWATERING *Rotoscoop*



6-ft. diameter Rotoscoop, particularly showing feed box and discharge plow, and the complete enclosure of driving machinery.



Above: A simplified sketch illustrating action of the Link-Belt Dewatering Rotoscoop.

Right: View of 15-ft. diameter Dewatering Rotoscoop at the T.V.A. Norris Dam project.

A PERFECTED SAND RECOVERY UNIT

For fine or coarse sand and similar material.

Capable of recovering fine grains and discharging dry enough for truck transportation.

Provides a simple method of saving special grain sizes formerly lost in the overflow water, which flows slowly in a wide, thin stream over an adjustable weir, thus preventing loss of fine grains of good material.

A self-contained unit requiring low headroom, and minimum space and foundations.

Large settling area and slow speed permit effective settling and washing of the solids from the water. Volume of fines and grading easily varied to suit requirements.

Requires little power in relation to its large handling capacity. Send for Folder 1463.

5308

LINK-BELT COMPANY

The Leading Manufacturer of Equipment for Handling Materials and Transmitting Power

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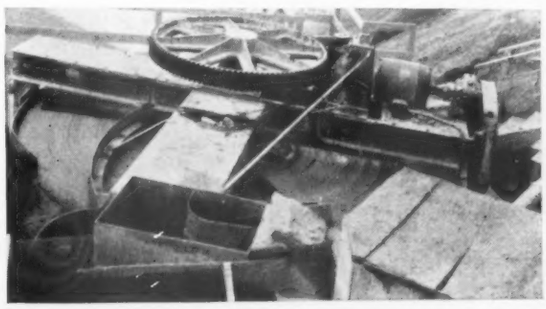

LINK-BELT HANDLING PREPARATION EQUIPMENT

APR -1 1936
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Pit and Quarry

With which is consolidated
CEMENT-MILL & QUARRY

Volume 27 JUNE, 1935 Number 12

MEMBER AUDIT BUREAU OF CIRCULATIONS

Published on the first of each month for producers and manufacturers of Cement, Crushed Stone, Gypsum, Lime, Sand, Gravel and other non-metallic minerals. Entered as second-class matter November 28, 1932, at the Postoffice at Chicago, Ill., under the Act of March 3, 1897.
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NRA U.S. CODE GRAPHIC ARTS INDUSTRY 1934

BOGS, BRICKS OR BOULEVARDS

—all the same to Goodyears

GOODYEAR Truck Tires are built to PERFORM. And they do—better and longer than any other tires made. That's because Goodyears are built for the job. For every type of truck—for every hauling job, there is a Goodyear Tire that will provide the utmost in dependable, economical performance.

For heavy construction hauling, excavation work, off-the-road service—for the kind of work your trucks do—Goodyear builds the Dump Truck All-Weather. Examine it. See how it's built to do your work better.

Notice those deep-cut diamond blocks of the All-Weather tread. There's traction. There's pulling-power.

See how that tread design extends down the sidewalls. Those tough bars of rubber give added traction in ruts—protection from cutting and scraping on sharp rocks and rough surfaces.

Underneath that tread is a body of Supertwist cord—the strongest, most durable cord ever developed for truck tires.

Look at that new, patented, extra-strong bead construction. Heavy, swaying loads on rough ground won't cause that bead to fail.

Goodyear Dump Truck Tires are built for your trucks. They're built to do your work better, longer—more economically. They're built to be MONEY SAVERS.

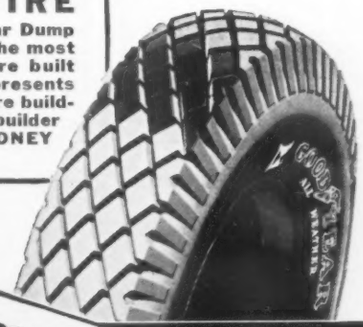
THE GOODYEAR TIRE & RUBBER CO., INC., AKRON, OHIO

CALL THIS MAN

He is the Goodyear Truck Tire Man. He represents the most complete line of truck tires made. Behind him are all the years of Goodyear's experience in the design and application of truck tires for every type of business—for every job. He'll pick the RIGHT tires for your trucks. His services cost you nothing. He'll save you money.

SEE THIS TIRE

It's the famous Goodyear Dump Truck All-Weather. It's the most scientifically designed tire built for dump truck work. It represents years of experience in tire building by the world's largest builder of truck tires. It's a MONEY SAVER.

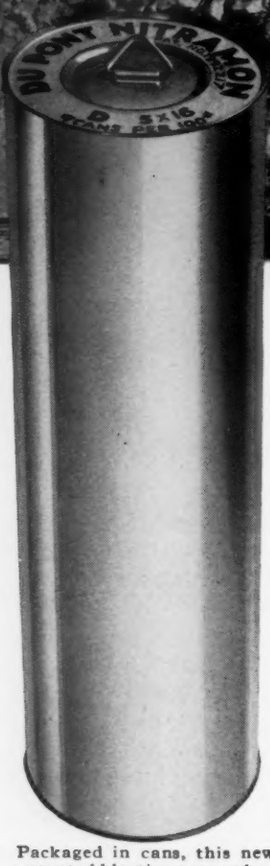


GOODYEAR

TRUCK TIRES

money savers

NITRAMON



Packaged in cans, this new patented blasting agent when manufactured and sold by the du Pont Company is identified by the trade mark NITRAMON. It is packed in containers from 4 to 8¼ inches in diameter and from 7 to about 65 pounds in weight.

BLASTING COSTS

from Seven to Twenty per cent

NITRAMON was announced to the trade January 22, 1935.

In sixty representative blasts to April 30, 1935—in quarries and stripping operations—one pound of NITRAMON has replaced an average estimated charge of one and one-quarter pounds of various grades of explosives.

From 7% to 20% savings in costs have been common.

Since its introduction to April 30, 1935—less than three months—more than 400,000 pounds have been ordered. In this short time, blasts have been made in dolomite, limestone, granite, sandstone, conglomerate, cement and traprock.

In addition to its economy of use, NITRAMON has other outstanding advantages:

1st. NITRAMON may be used with a high degree of safety. It really is not an explosive in the accepted sense of the word. It cannot be detonated by blasting caps, by Cordeau, by flame, by friction or by impact.

2nd. NITRAMON is waterproof. It is packed in tightly sealed metallic cans.

3rd. NITRAMON produces no headaches--contains no nitroglycerine.

4th. NITRAMON will not freeze.

5th. NITRAMON loads quickly because of its convenient package.

A bulletin containing complete information on grades available and methods of use will be sent on request.

E. I. DU PONT DE NEMOURS & CO., INC., Explosives Department, Wilmington, Delaware

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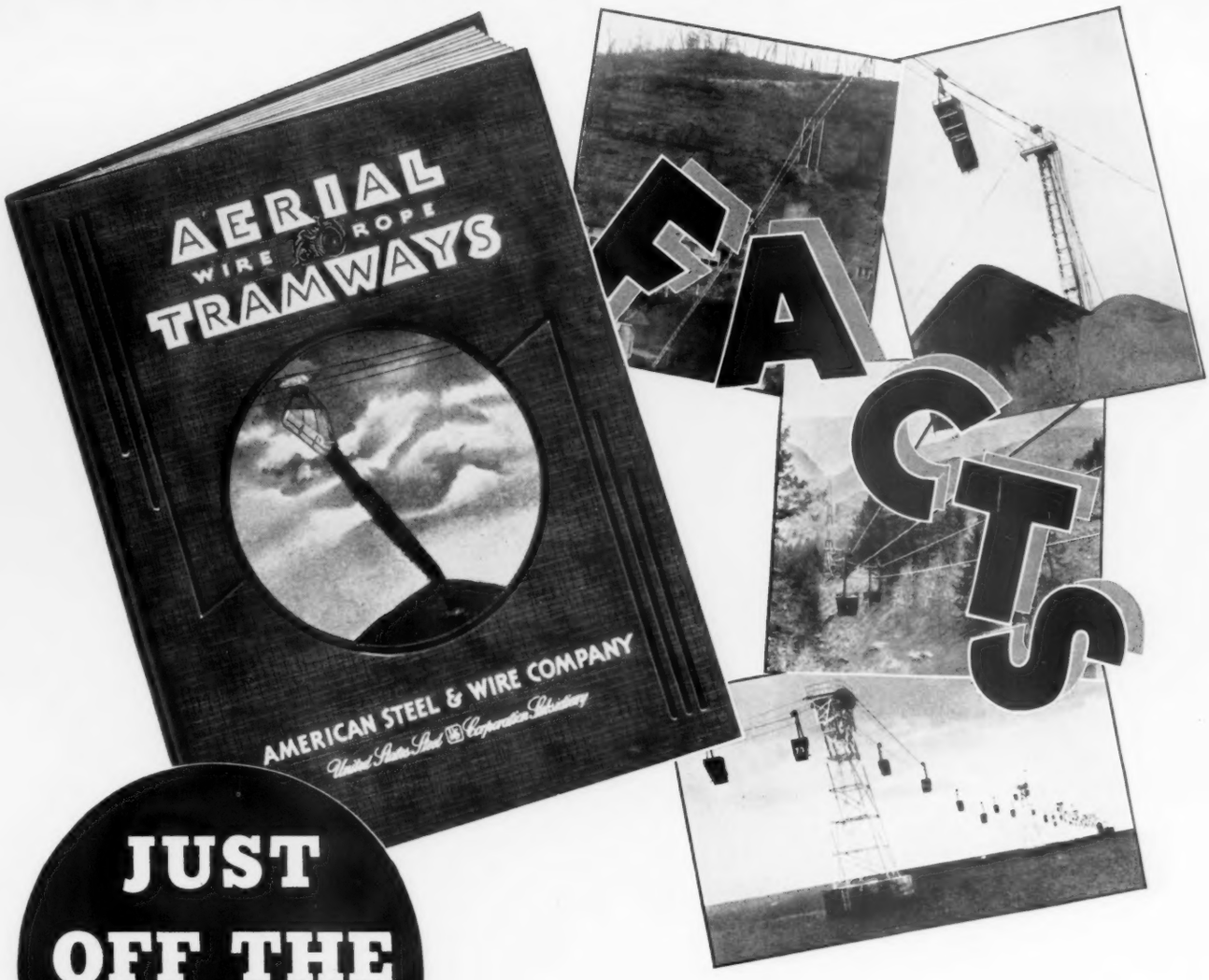
NITRAMON

TRADE MARK

THE IMPROVED BLASTING AGENT



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Raymond Roller Kiln Mill

Roller Kiln Mill for drying, grinding and separating in one simultaneous operation.

equipped with WHIZZER SEPARATOR

THIS combination unit enables you to grind and dry your product in one operation and provides instant fineness control, from about 80% passing 100-mesh to 99.95% passing 325-mesh, simply by changing the speed of whizzer.

In a recent installation, excellent results are obtained in pulverizing two different materials, a dense grade of limestone and a natural chalk similar to English chalk. The limestone, coming direct from the quarry with considerable moisture, is ground at a rate of 5,000 lbs. per hour to a fineness of 99% minus 300-mesh, delivered as a dry powder. The chalk, containing about 8% moisture as fed to the mill, is reduced to a bone-dry powder of the same fineness at a rate of 6,000 lbs. per hour. By varying the whizzer speed, the fineness is regulated to meet specifications for any grade of product.

If you have a problem that involves grinding, drying and close control over the finished product, write for details of this economical method.

RAYMOND BROS. IMPACT PULVERIZER CO.
Division of Combustion Engineering Co., Inc.
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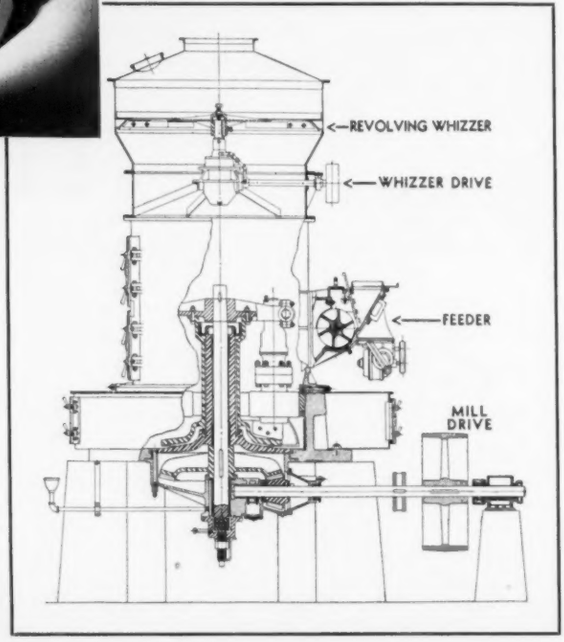
Combustion Engineering Corp., Ltd., Montreal



Cross-section showing whizzer device mounted on vertical shaft in separating chamber above mill. Changing whizzer speed through a variable transmission regulates classification of product.

Since 1887

RAYMOND

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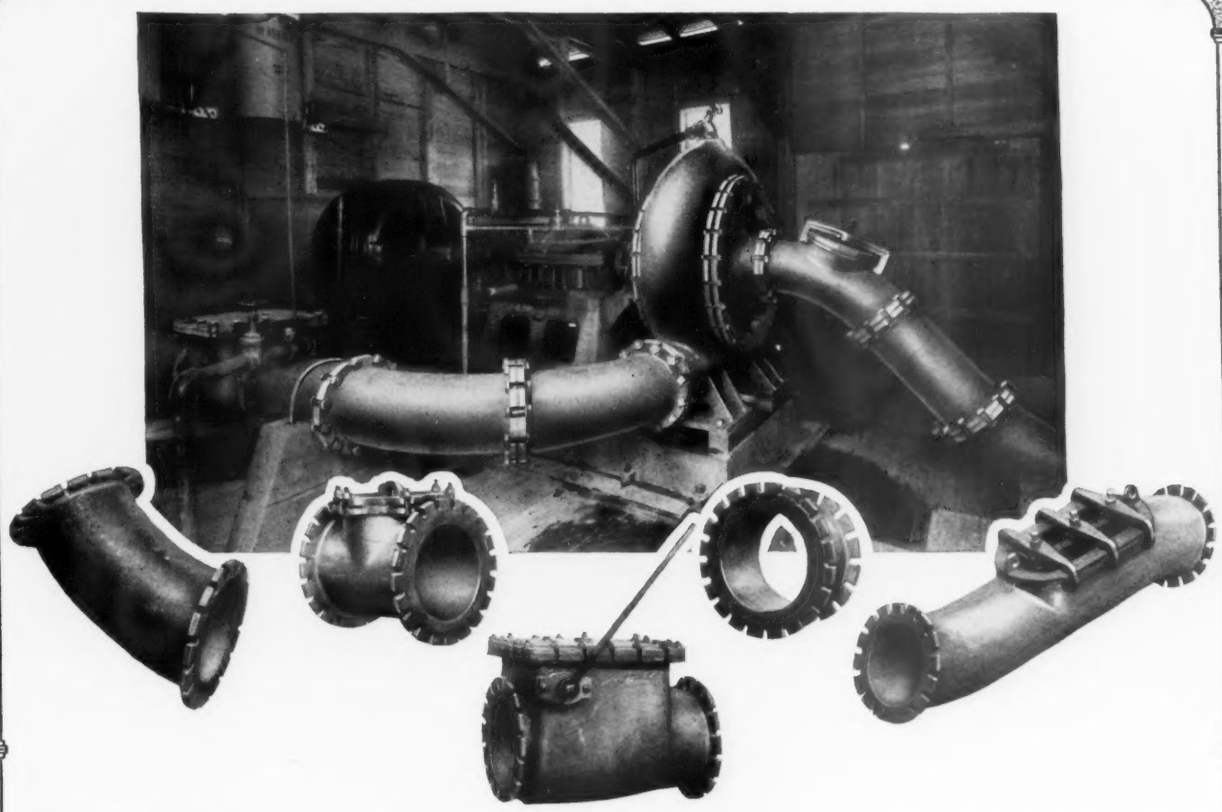
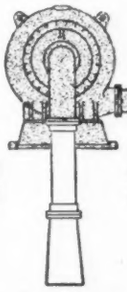


HYDRAULIC DREDGE PIPE LINE FITTINGS

AMSCO Dredge Pipe Line Fittings fully meet the needs of the Hydraulic Dredging Industry for strong and long-service fittings in pump and pipe line hook-ups. They have been used successfully for years under the most severe pipe line velocity and pressure conditions. Their use contributes to the highest overall efficiency of hydraulic dredges at minimum cost of repair parts and repair labor, and assures the greatest number of productive operating hours. They embody: Safety, Dependability, and Economy.

We make a complete line of AMSCO Fittings, incorporating Elbows, Pipe, Offset Pipes, Nipples, Reducers, Flap Valves, Expansion Joints, Pipe Flanges and Hose Nipples, in standard designs, and have patterns available for almost all types of parts, in the range of popular sizes from 3-inch to 18-inch, inclusive. For sizes of fittings larger than 18-inch, we have numerous designs and patterns, but since these larger sizes of fittings are generally built to meet some particular dredge specifications, we consider them special. We are prepared to design and build any size and type of Special Dredge Fittings, within conservative length dimension, to suit individual installation requirements.

AMSCO Dredge Pipe Line Fittings are made of analytically controlled, scientifically heat treated AMSCO manganese steel, the "Toughest Steel Known", which, being unequalled for its shock and wear resistance, assures long time, trouble-free operation.



We invite your inquiry for application details on AMSCO Dredge Pipe Line Fittings. We will gladly furnish descriptive information and prices to interested parties. Write for details today!

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Division of American Brake Shoe & Foundry Company

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Foundries at Chicago Heights, Ill.; New Castle, Del.; Denver, Colo.; Oakland, Calif.; Los Angeles, Calif. • Offices in Principal Cities

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AMSCO

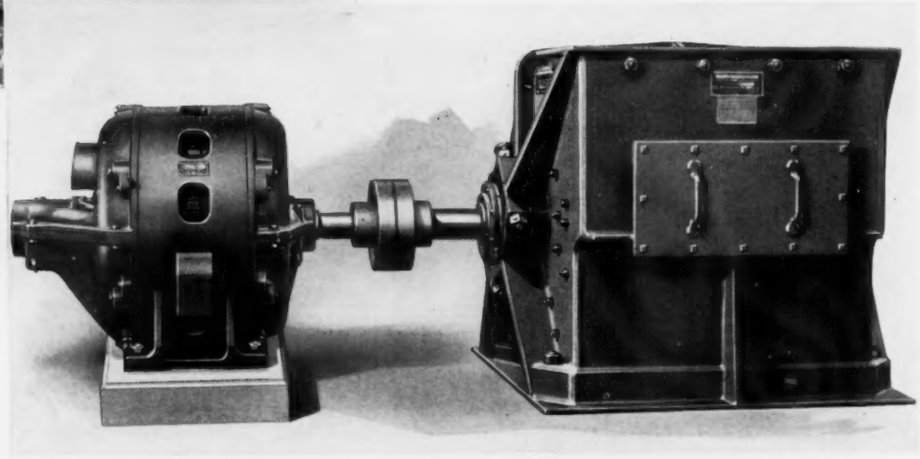
TRADE MARK REGISTERED

Making Concrete Sand at NORRIS DAM

Above—Norris Dam one-third completed. Photo taken 12-13-34.

BECAUSE of the excellent product made, a great saving resulted through the use of sand produced with Allis-Chalmers Pulverators by The Tennessee Valley Authority in the construction of Norris Dam. These machines are producing a granular product from dolomitic limestone, at the rate of 60 tons per hour with minus 3″ feed and fully conforming with the specifications of the U. S. Government engineers. They are operated in closed circuit with Aero-Vibe screens producing two sizes of sand. These machines may be inspected at any time.

The Allis-Chalmers Pulverator is not just "another hammer-mill". It breaks material in an entirely different way. The hammers strike the material squarely and drive it squarely against a series of involute breaker plates reducing it to the desired size. Pulverators such as those operating at Norris Dam, are of welded steel construction with anti-friction bearings. They can be used on any non-abrasive material. Write the nearest Allis-Chalmers District Office for further information.



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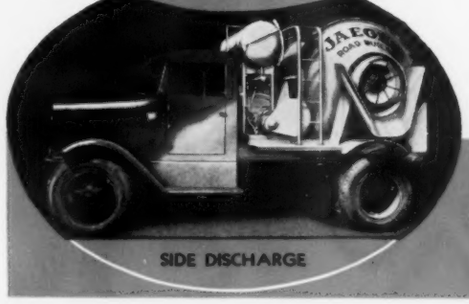
Foundations, Piers, Bridges, Floors, Conduits, Buildings and All General Concrete Work!

Every Job's a Jaeger Job in 1935

PAVING

and Widening Streets, Roads, Alleys, Curb and Gutter Work, Sewers, and Sidewalks

END DISCHARGE



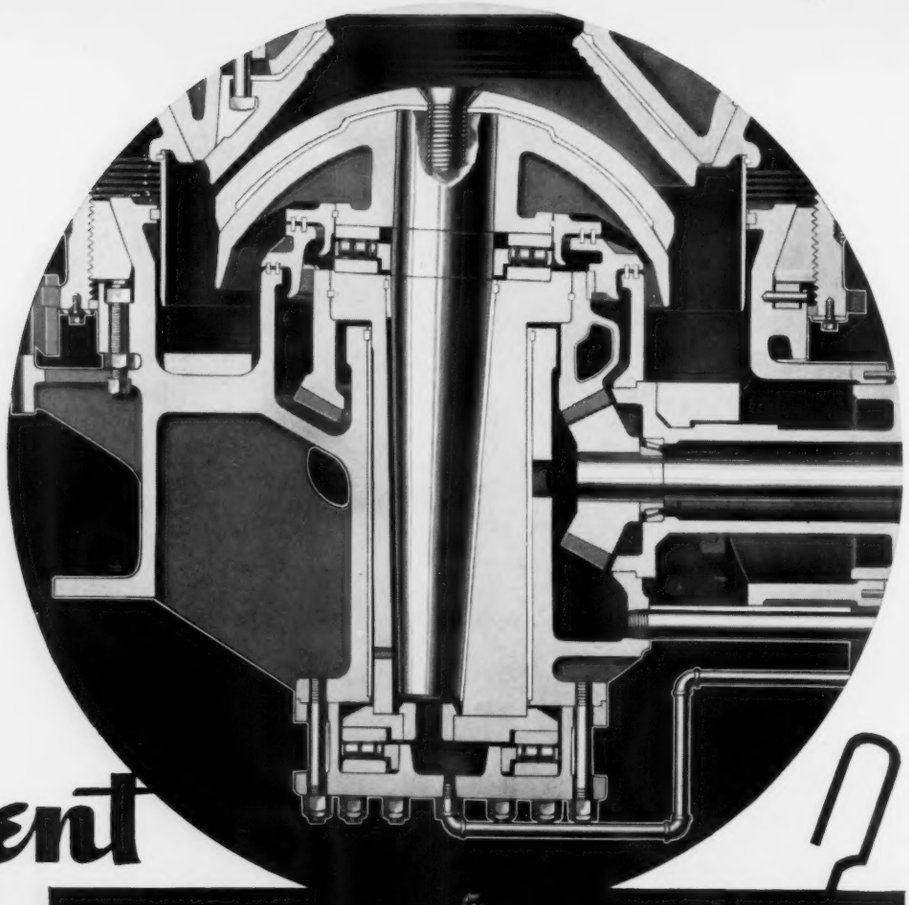
SIDE DISCHARGE

BIG jobs and small ones, general construction and road work—they're all using Jaeger Truck Mixers this year to get lower costs and "Dual-Mix" higher strength concrete.

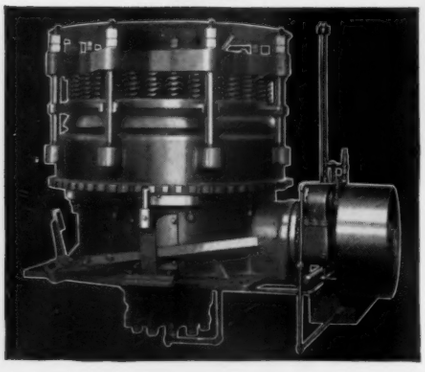
Producers and contractors have agreed that Jaegers are faster, get bigger yardage, cost less for upkeep, are more efficient in meeting job conditions. Built in both side-discharge and end-discharge types, 1 to 5 cubic yard capacities. Write for prices, full details to THE JAEGER MACHINE COMPANY, 602 Dublin Avenue, Columbus, Ohio.

RENTED BATCH TRUCKS MAKE THE LONG HAULS

On road work or suburban deliveries, use Jaeger Transfer Loader. Keeps Truck Mixers on short hauls. More trips per day, more yardage.



WHAT'S Different ABOUT THE TELSMITH GYRASPHERE



The spherical head and corresponding concave (shown above) are adapted from the first crusher devised by primitive man—the mortar and pestle. The parts are inverted to facilitate discharge; but the crushing action is the same. Particles are caught and broken *between two multi-curved surfaces,* causing an ideal cubing action. The same mechanism that ground corn meal in ancient Egypt now produces an improved cubical aggregate in modern mines and quarries. *Write* for Bulletin Y-15.

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TELSMITH Y-6

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STREAMLINING can be had in an excavator. Not in the same sense that we use it in connection with the modern automobile, plane or high speed train. LIMA--the modern excavator--carries the idea beyond the appearance and into the performance of the shovel, dragline or crane.

Roller bearings and helical gears throughout, large diameter drums and clutches, splined shafts and square lever shafts make for smooth, quiet, easy performance. Ample power is always available for hoisting, swinging, propelling, and raising or lowering the boom simultaneously, if necessary.

These advantages, and innumerable others, speed up production and give streamline performance in every kind of digging. The modern excavator in line with the times.

Lima Locomotive Works, Incorporated

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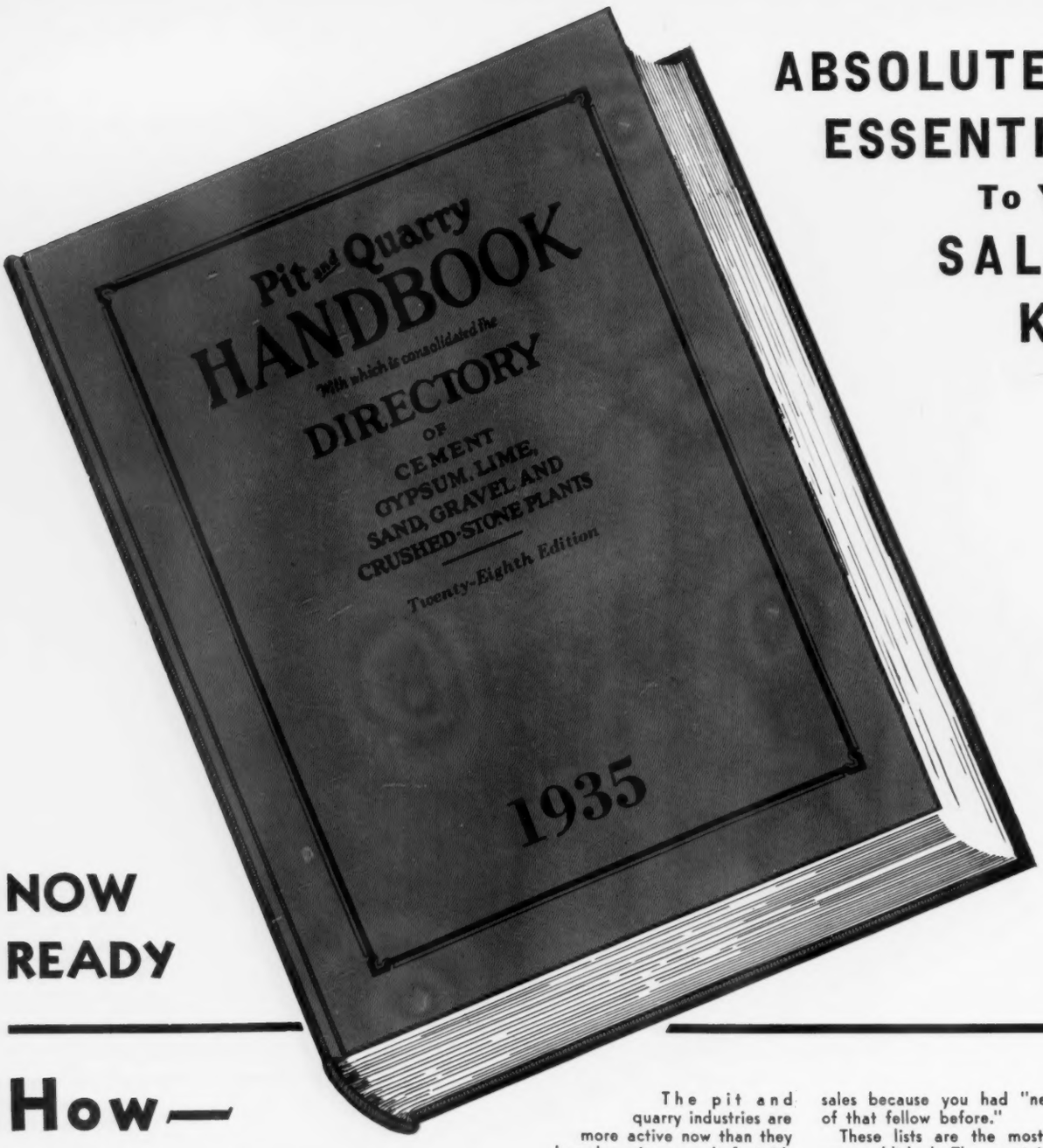
LIMA

One of three LIMAS owned by Sam Orino, Spokane, Wash. This Type 601 is working on the Bonneville Dam.

LIMAS ARE BUILT IN 3/4 YARD CAPACITY AND LARGER

ABSOLUTELY ESSENTIAL To Your SALES KIT



NOW READY

How—

—accurate and complete are your prospect lists?
—much "deadwood" is there on your prospect lists?
—much do you know about your prospects?
—much do you waste per year on poor lists?
—many "not there" calls do your men make?
—much do you know about new developments?

The pit and quarry industries are more active now than they have been in years. In fact, it's one of the most active fields in industry. It's natural. For before the roads, dams, bridges, buildings, etc., can be built under the public works program the raw material has to be furnished.

Get your share of it. Don't miss fire with poor prospect lists. Don't lose sales because you had "never heard of that fellow before."

These lists are the most complete ever published. They contain hundreds of new names. They have been completely revised—all listings have been brought up to the minute.

Regardless of whether your territory covers only one state or the whole country the investment in a copy of Pit and Quarry Handbook is something that will pay big dividends—in sales.

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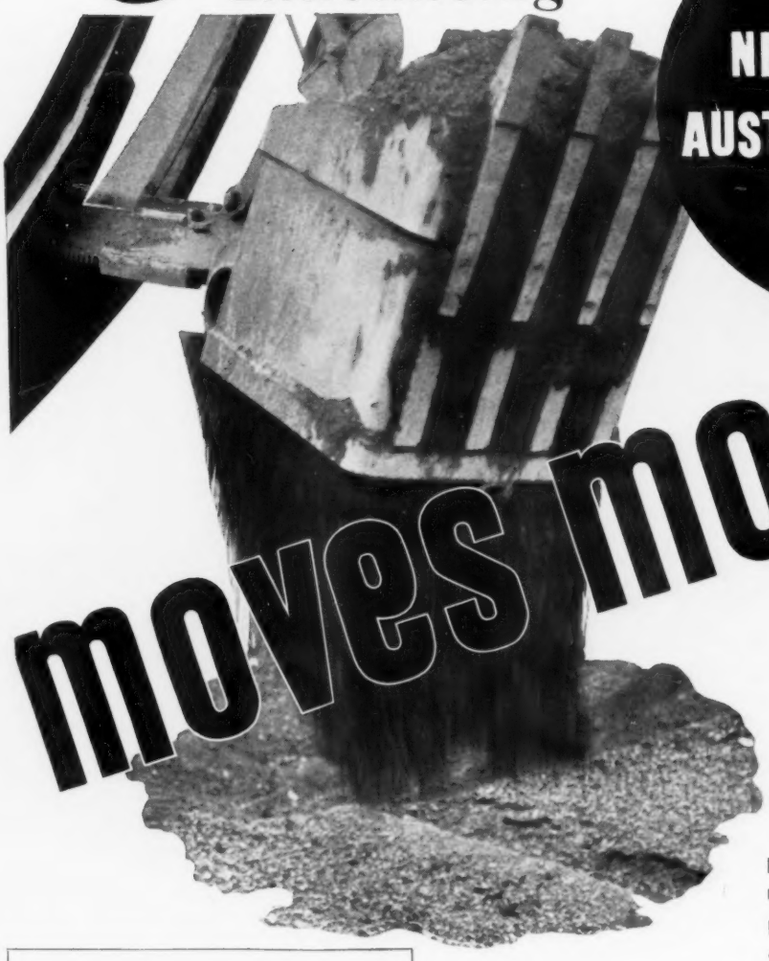
Firm .....

Address 6-35

Announcing

A NEW MODEL AUSTIN-WESTERN BADGER



moves more dirt

more power less swinging weight

● Speed of operation has always enabled the Badger to compete with larger shovels in capacity per hour.

Those familiar with the Badger's operating principle (see diagram) will readily see how a reduction of dead weight and an increase in the power of the motor has given this new unit a capacity, both in speed of digging and loading, far ahead of any other similar equipment.

Through the use of alloy steels in boom, dipper stick, and bucket the dead weight of these parts has been reduced. This saving in addition to the increased horse power makes it the ideal tool not only for speed of operation but for rapid transportation and easy handling. Can be furnished with a half-yard bucket at slight extra cost.

Write for details on the engineering features of this machine which make it the big producer at low operating costs.

The Austin-Western Road Machinery Co.
Home Office: Aurora, Ill. Cable Address: AWCO, Aurora
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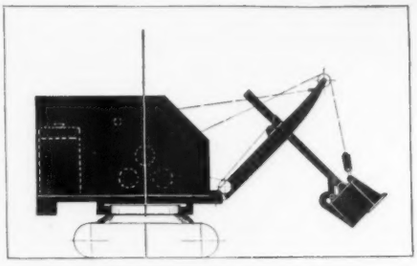
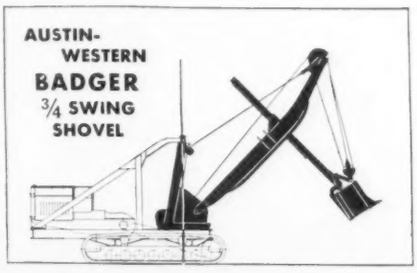


The essential difference between these two shovel designs is whether the counterbalancing weight must be moved at every swing or can be used effectively while standing still. Notice that in the Badger the boom is counterbalanced by *idle weight*. Fast starting against minimum inertia and prompt stopping without waste of time and force to brake the momentum are achieved.



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SCARIFIERS · BULLDOZERS · TRAILERS · SCRAPERS · PLOWS

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CRUSHING AND WASHING PLANTS · SWEEPERS AND SPRINKLERS · SHOVELS · CRANES · ETC · SNOW PLOWS

The Austin-Western Road Machinery Co.
A-7, Aurora, Illinois

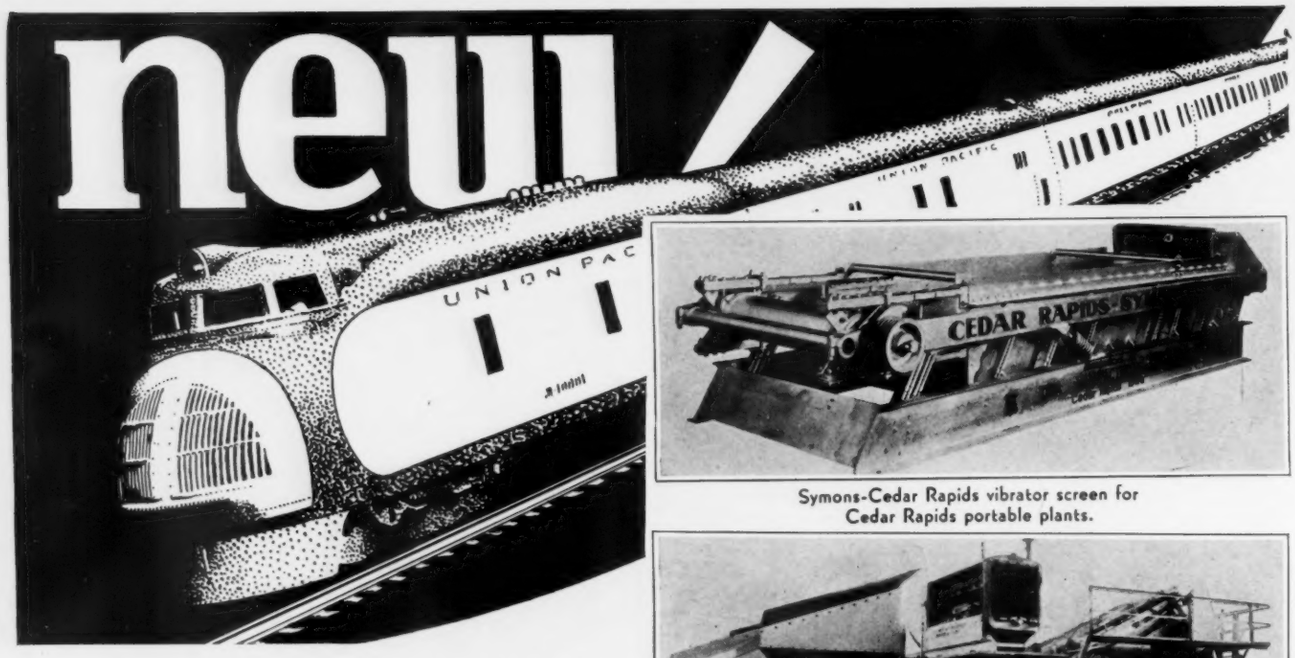
Please send complete information on the new Badger Shovel.

Name.....475

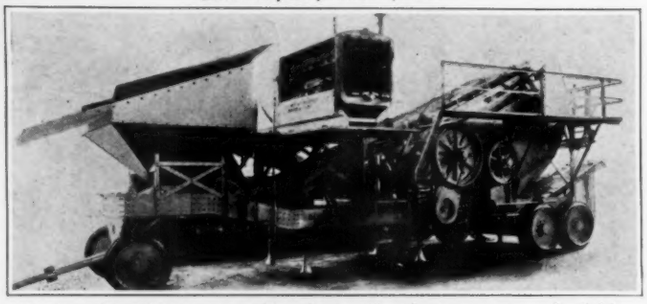
Address.....State.....

City.....

new

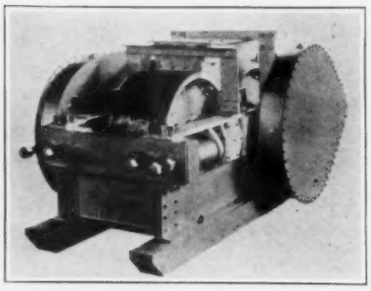


Symons-Cedar Rapids vibrator screen for Cedar Rapids portable plants.



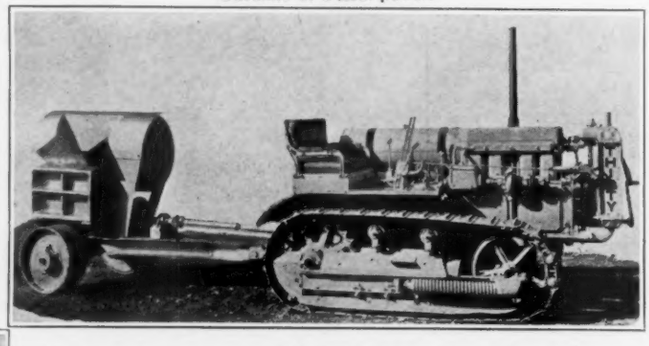
Tandem Straight Line portable plant with vibrator screen. Available in all sizes—with jaw or roll crushers for secondary reduction. Gasoline or Diesel power.

Pictured here are six new and important additions to the Cedar Rapids line. Equipment to meet every crushing, screening, or material handling requirement. Write for descriptive circulars on any equipment in which you may be interested.

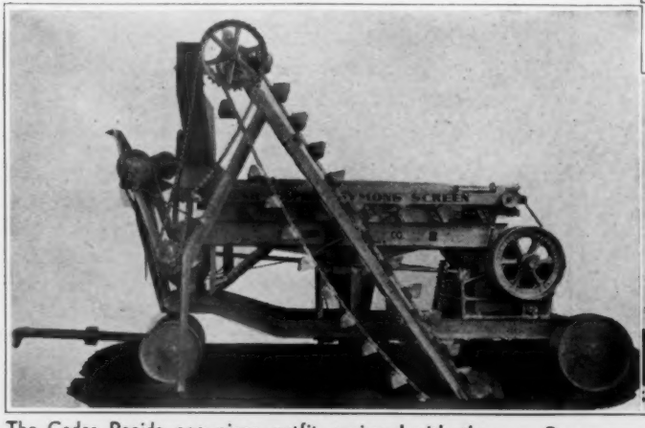


40 in. by 20 in. Cedar Rapids roll crusher. Made in two other popular sizes— 30 in. by 18 in. and 16 in. by 16 in.

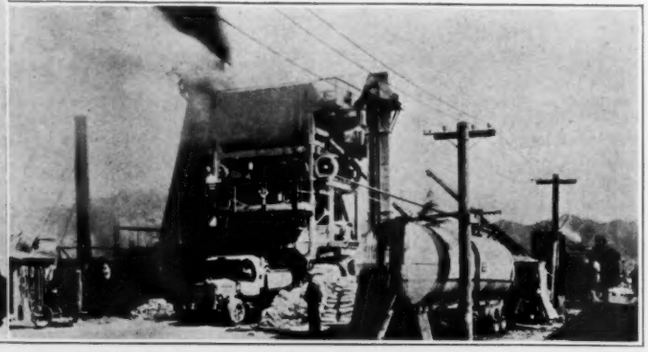
More Complete Than Ever Before



Tractor-trailer conveyor unit for roadside operation. Many other sizes and styles available.



The Cedar Rapids one piece outfit equipped with the new Symons vibrator screen — for greater capacity and efficiency. Ask us about the "Symons Changeover Plan" for present plants with rotary screens.

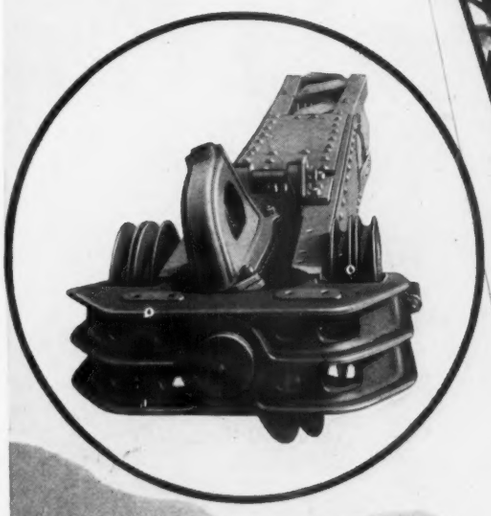


Standard-Cedar Rapids asphalt paving plant. Made in sizes with 500 to 5000 pound twin pugmills. Batch type plants with dryers, electric timing and locking devices — meets the most rigid state specifications.

IOWA MANUFACTURING COMPANY
CEDAR RAPIDS, IOWA

KOEHRING

KOEHRING Heavy Duty Construction — Easy and positive steering in any direction, by lever control from the cab — self-equalizing double outside band friction clutches — low ground pressure — swiveling boom point fairlead for reducing cable wear—*all important features for dragline work* — available with a Koehring Dragline.



The Koehring boom point fairlead saves cable by eliminating cross pull and self-aligning cables regardless of bucket position.

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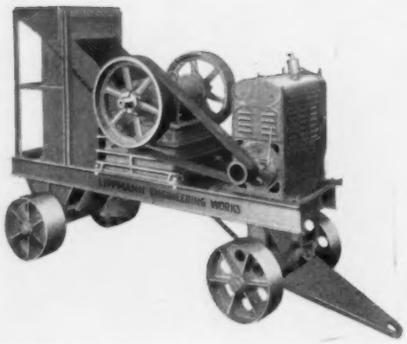
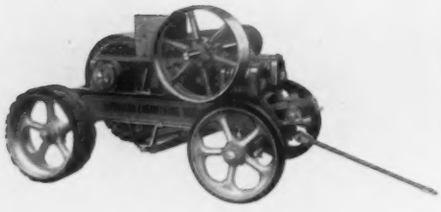
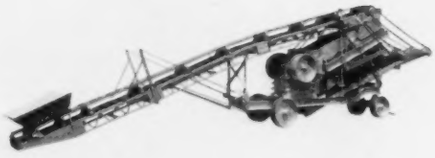
Reliable machinery is a product of experience and performance. That is why Lippmann equipment steadily gains in popularity. Every unit is developed from actual working tests in day-by-day service. All "weak links" are eliminated by adding extra strength where necessity demands. The exclusive features of design are the result of years of improvements. Producers and operators throughout the industry are profiting by the efficiency and economy of Lippmann crushers, screens, feeders, conveyors, elevators, classifiers, hoppers, bins, settling tanks, log washers and scrubbers, and complete gravel washing, screening and crushing plants. You can secure the maximum savings by using the complete Lippmann line on your future jobs.



Portable Crusher with Grizzly and Power Unit

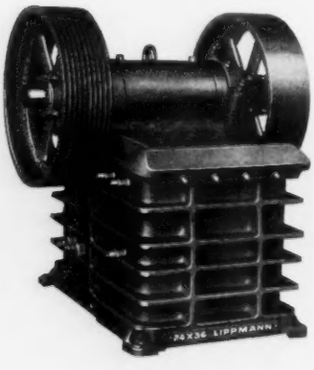


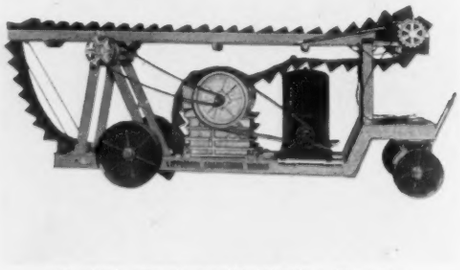
Portable Crushing Rolls



Portable Crushing and Screening Plant

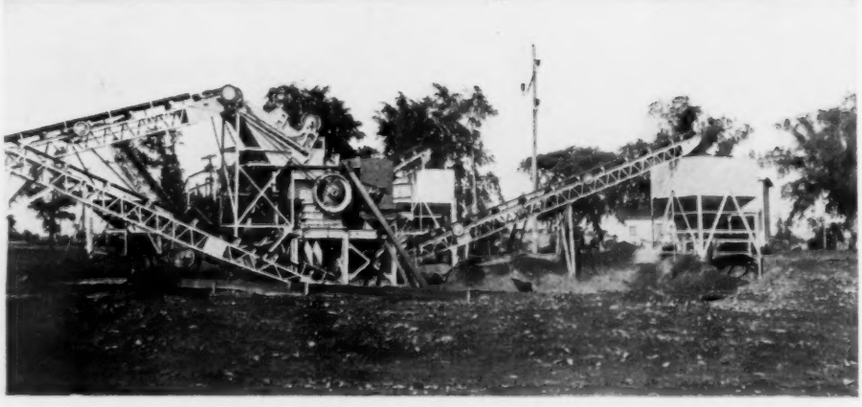
Portable Pulverator with Folding Elevator





Portable Crusher with Folding Elevator

Here is a typical report from a satisfied user of Lippmann's portable crushing, washing and screening plant: "I never saw a better working plant. It produced all the material, 1½" maximum, for over 13 miles of road in less than 8 weeks, without any trouble whatsoever, working only one shift without overtime."



Write for information on equipment in which you are interested. Descriptive Bulletins will be sent on request.

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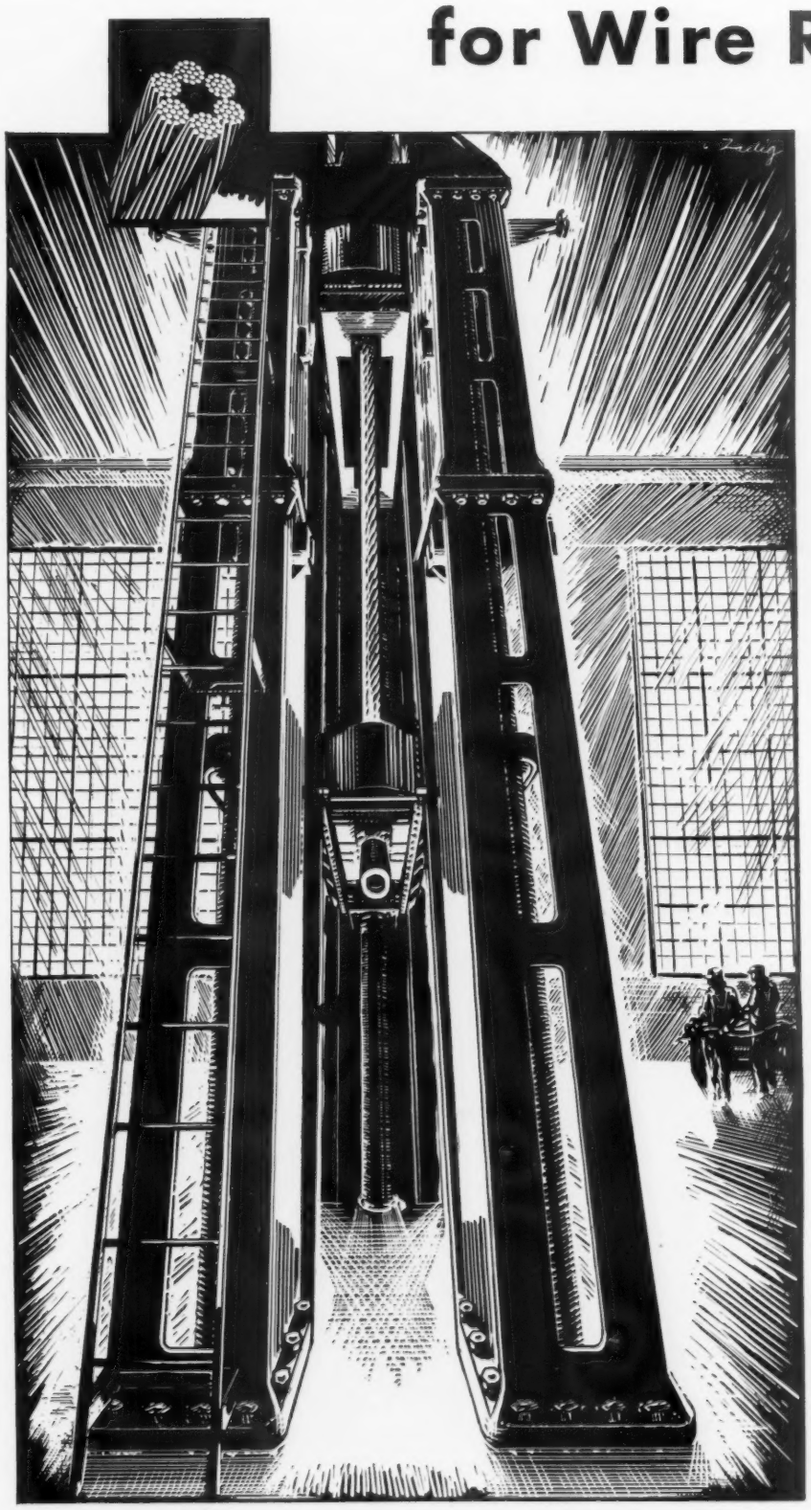
A Tower of Torture
for Wire Rope



ONE OF THE WORLD'S LARGEST PRECISION TESTING MACHINES

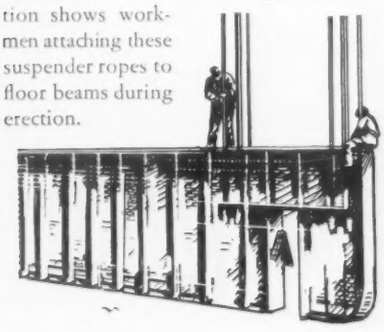
This giant testing machine has a capacity of 2½ million pounds, is 43 feet high, and weighs 138 tons. Routine specification tests of Roebling Rope are made on this and other Roebling testing machines which range in size down to 200 pounds capacity.

CAN PULL APART 6" SQUARE STEEL BAR

CAN CRUSH CAST IRON COLUMN 15' LONG, 15" DIAM., WITH 1¼" WALLS

CAPABLE OF TESTING LARGEST ROPES MADE

It was first used for tension testing the huge 2⅞ inch Roebling Suspender Ropes for the George Washington Memorial Bridge, between New York and New Jersey. Illustration shows workmen attaching these suspender ropes to floor beams during erection.



FOR YOUR PROTECTION: To make certain that Roebling Wire Rope will give the user the highest obtainable degree of safe, economical service, Roebling has left no stone unturned. It has enlisted the aid of the finest and most complete research, testing and manufacturing facilities. This testing machine is an example. John A. Roebling's Sons Company, Trenton, N.J. Branches in Principal Cities.

ROEBLING ...THE PACEMAKER IN WIRE ROPE DEVELOPMENT

June, 1935

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Prices are shown on the order blank below. Check the books you want, detach the order blank (only) and send it to us with your remittance.

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The Directory. Alphabetical and geographical lists of all non-metallic mineral plants in the United States and Canada, conveniently keyed for product.

Pit and Quarry Directory. The Directory section of the Handbook, published separately.

Cements, Limes and Plasters. By Edwin C. Eckel, C.E., Consulting Geologist. Third edition; 699 pages 6x9; 161 figures; 269 tables; cloth. A complete and comprehensive review of the raw materials, methods of manufacture and properties of the finished product, of all kinds of cementing materials used for construction.

Portland Cement. By Richard K. Meade. Third edition; revised and enlarged; XII+707 pages, illustrated. The composition, raw materials, manufacture, testing and analysis in the Portland cement industry.

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Diesel Engines. By Lacey H. Morrison. 598 pages 6x9; 385 illustrations. The book describes the various forms of Diesel engines now available, explains their construction and operation, tells how to keep them running in good condition and how to install them. Actual operation costs of Diesel engines now in use in various industries are included.

The Stone Industries. By Oliver Bowles, Supervising Engineer, Building Materials Section, United States Bureau of Mines. Covering the building-, decorative-, and crushed-stone industries in all their ramifications. It describes rocks and covers the geology and distribution of developed deposits in every state. It embraces the qualities of stones, their uses, methods of quarrying and manufacture, and marketing. Chapters are devoted to limestone, sandstone, granite, marble, slate, soapstone and foreign building and ornamental stones.

Excavation Machinery, Methods and Costs. By A. B. McDaniel, Principal Engineer, Construction Division of the Army. 530 pages 6x9; illustrated. Contents: Tools for loosening and hand excavation; drag and wheel scrapers; blade or road graders; elevating graders; capstan plows; power shovels; scraper, templet, trench, and wheel excavators; cableways; dipper, ladder and hydraulic dredges; subaqueous rock drills; car and wagon loaders; highway and railroad construction; reclamation work; rivers, harbors and canals; municipal improvements; quarries, open-cut mines, gravel pits and brick yards; tunnels and underground mines.

Diatomaceous Earth. By Robert Calvert. A description of the present day industry of diatomaceous earth, its occurrence, mining and preparation, physical properties, and the rapid expansion of its use and application to new industries. Illustrated. 256 pages.

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CONTENTS: Clarification; Cake building; Cake washing; Cake drying; Cake discharging; Filter media; Theory of filter application; Auxiliary equipment; Theory and mechanics as related to practice; Bag filters; Plate and frame presses; Suction leaf filters; Pressure leaf filters; The Kelly filter; the Sweetland filter, the Vallez filter; Rotary vacuum filters; Oliver filter, American continuous filter; FEinc apparatus; Special filters and clarifiers. Door apparatus, Merrill filter, Atkins-Shriver press, Burt filter, Zenith rotary hopper dewaterer, Oliver rotary sand table, FEinc acid sand filter; Application of different types of filters; Relation of filtration to other plant operations, drying, evaporation, etc., combination filtering and drying; Plant practice; Index.

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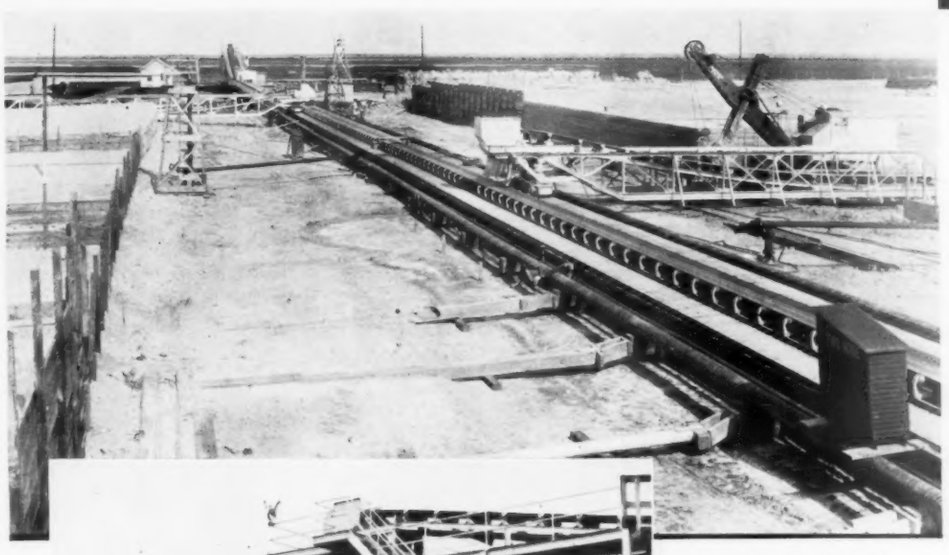
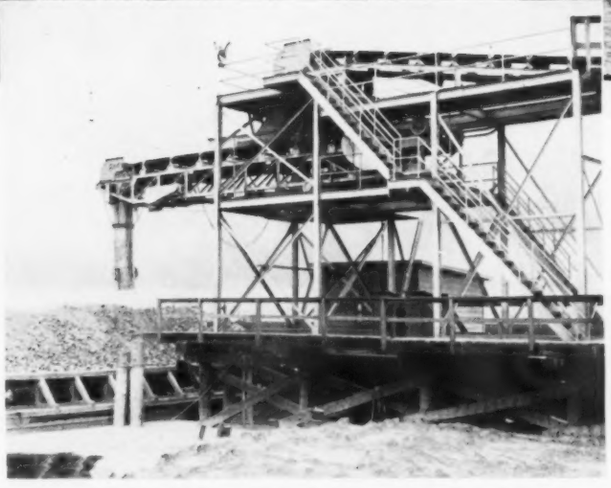
FOR FREEPORT SULPHUR





S-A Conveyors Are Used for Handling Sulphur in This New Gulf Coast Operation

The bigger the job, the greater the need for S-A material handling equipment and S-A engineering. This dictated the choice of S-A Belt Conveyors and other handling and loading units for the Freeport Sulphur Co. operations at Grande Ecaille and Port Sulphur, Louisiana.

The sulphur is reclaimed and loaded into boats and barges at a rate of 500 tons per hour and at a minimum cost per ton. Some of the S-A conveyors are nearly a thousand feet long.

S-A Engineers also designed and built the conveying, elevating and screening equipment for the new "burned dolomite" plant of the Kelley Island Lime and Transport Co. at Clay Center, Ohio. One of the important units there is the 240′ S-A Pivoted Bucket Conveyor.

1—Main S-A trunk line belt conveyor, 36" by 980′ centers, delivering to the S-A barge loading dock at Grande Ecaille.

2—S-A Shuttle conveyor and dock for loading barges at Grande Ecaille plant.

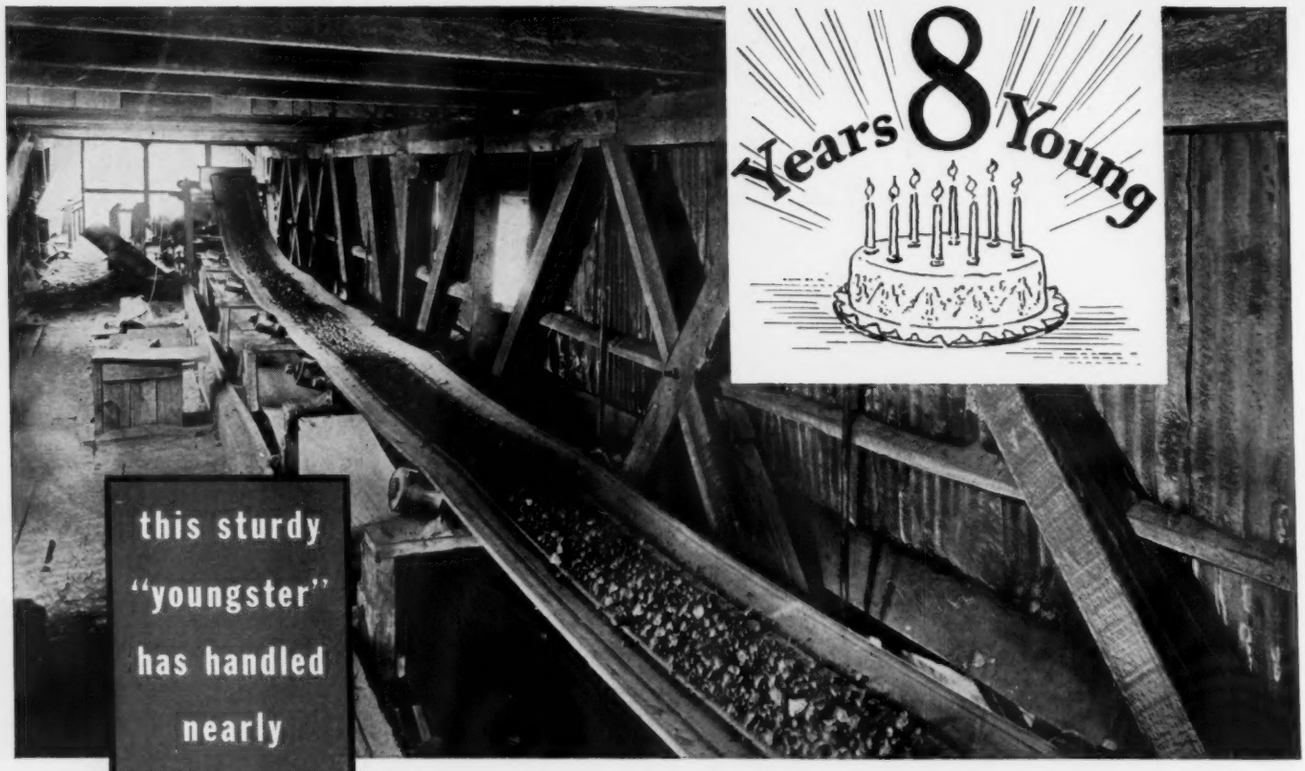
3—Discharge end of S-A loading conveyor at Port Sulphur.

Refer your material handling, screening and washing problems to Stephens-Adamson. Experience, service and a complete line of *Conveyor Products*.

STEPHENS-ADAMSON

59 Ridgeway, Aurora, Illinois

Los Angeles, California **Belleville, Ontario**



-and still asks for more!

Back in 1927 this 740-ft. 18 inch 7 ply U. S. Hot Fines Conveyor Belt started its life of usefulness for the Spokane Portland Cement Company, Irvin, Wash.

By the fall of 1931 it had handled 1,235,000 barrels of cement at a temperature of approximately 235 degrees!

And it still is keeping everlastingly at it! That's stamina! That's performance! To date this belt has needed no repairs. The cover and the carcass are still in excellent condition—will undoubtedly handle many more thousands of barrels.

Impressive as this service record is to anyone who knows belts, it but reflects the outstanding quality of *all* belts manufactured by "U. S."

At any time, we will be glad to work with you to the speedy, practical solution of any belt problem that may arise in your plant, be it Conveyor, Elevator or Transmission belting. Address our nearest branch.

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VOLUME 27 NUMBER 12

Pit and Quarry

With which is consolidated

CEMENT-MILL & QUARRY

CHICAGO, JUNE, 1935

1935 Lime Convention Unusually Important

CODE DISCUSSION A FEATURE

At the Homestead Hotel, Hot Springs, Va., lime manufacturers will assemble for the annual convention of the National Lime Assn., which will be held there on June 19 to 21. The program calls for a meeting of the lime code authority on Monday, June 17, and for a meeting of the National Lime Assn. Board of Directors and Executive Committee on June 18. There will be a half-day session covering a symposium on the chemical treatment of sewage and another to the presentation of a talking film strip on the subject "The Sweet Earth." There will be discussions of the relationship of the lime industry to the program of the Federal Housing Administration, the new safety contest, which will be started July 1, and the industry conference on matters relating to the N. R. A.

In view of the Supreme Court's decision, there may be some change in plans with relation to the Code Authority meeting as well as with reference to the discussion of N. R. A. subjects.

New Crushed Stone Plant Completed in Virginia

★ The Liberty Limestone Co., Buchanan, Va., has completed a new crushed stone plant. Equipment installed includes an Allis-Chalmers jaw crusher, Telsmith vibrating screens, Kennedy-Van Saun crusher, Williams hammermill, Ruggles Coles drier, etc.

F.H.A. Housing Program Showing Steady Growth

The Better Housing Program of the Federal Housing Administration is showing a healthy growth, according to recent reports. On May 25 property owners throughout the country had pledged themselves to spend $404,348,802 on modernization and repair in coöperation with the program. Most of the pledgors indicated their intention of paying cash for the improvements, but by the same date credit amounting to $72,591,589 had been furnished by private financial agencies to 174,958 applicants under the terms of the Modernization Credit Plan.

Western Cement Plant Making Improvements

★ Pouring concrete on the four new blending tanks of the Spokane Portland Cement Co. has been completed. The tanks are 42 feet high and 20 feet in diameter. The construction of the tanks is part of a $250,000 improvement program to put the plant in shape to turn out cement for the Grand Coulee dam construction.

Annual No-Accident Campaign by P.C.A.

A "June No-Accident Campaign" is being sponsored by the Portland Cement Association for all cement plants in the country. The first June safety campaign was conducted in 1925 and resulted in a reduction of accidents amounting to 63 per cent. compared with June of the previous year. Many of the superintendents of the cement plants are holding safety meetings prior to the beginning of the campaign.

Bedford-Nugent Buys Kentucky Gravel Plant

The Bedford-Nugent Co. of Evansville, Ind., has purchased the properties and equipment of the Henderson Sand & Gravel Co. of Henderson, Ky. The purchase price was understood to be $25,000. The scarcity of good gravel near Henderson, Ky., previously made it necessary for the Bedford-Nugent Co. to tow gravel 35 miles to this location.

Eastern Stone Producer Installs New Equipment

★ Wm. Bambi & Sons, Norristown, Pa., have improved their crushed stone plant by the installation of two Perfect classifiers, a Tyler Hum-mer screen and a Chambers Bros. clay crusher.

★ The Whitehall Tatum Co. has improved its glass sand plant at Millville, N. J., by the installation of its fifth James ore concentrator.

Aggregate Directors Schedule June Meeting

ADVANCE DATES TO JUNE 29-30

Concurrent meetings of the boards of directors of the National Crushed Stone Assn., the National Sand & Gravel Assn. and the National Slag Assn. and a joint meeting of the three boards will be held at the Palmer House, Chicago, Saturday and Sunday, June 29 and 30. The meeting of the sand-and-gravel board, formerly announced for July 10 and 11, has been changed to the earlier dates.

This change in plans resulted from action taken in meetings of the executive committees of the three associations held in Washington June 4, when it was decided that there should be an early meeting to consider ways in which the three associations can retain the benefits that have come from the operation of their code and advance their common interests.

Between June 16, the day on which the National Industrial Recovery Act expires and code authorities cease to have official status, and the date of the board meetings the Executive Council of the Code Authority will act, by appointment of the three associations' executive committees, as a joint committee of those associations for maintaining contact with the federal government in their behalf.

Cement Plant Operations Continue Increase in May

Cement plant operations continued to increase in May at a rate which indicates a considerable gain in production over the previous year in that month. Among the many plants which resumed operations in May were: Lehigh Portland Cement Co., Mason City, Ia., and Oglesby, Ill.; Medusa Portland Cement Co., Dixon, Ill.; Northwestern States Portland Cement Co., Mason City, Ia.; Lone Star Cement Co., Greencastle, Ind.; Standard Portland Cement Co., Painesville, O.; Wabash Portland Cement Co., Stroh, Ind.

★ The Campbell Limestone Co. has completed the construction of a new plant at Gaffney, S. C.

A.S.T.M Meeting Interests Producers

IMPORTANT PAPERS SCHEDULED

The 38th annual meeting of the American Society for Testing Materials will be held at the Book-Cadillac Hotel, Detroit, during the week of June 24. Among papers of principal interest to aggregate producers to be presented on Thursday and Friday are the "Report of Committee D-4 on Road and Paving Materials," the paper by D. O. Woolf and D. G. Runner on "The Los Angeles Abrasion Machine for Determining the Quality of Coarse Aggregate," the "Report of Committee C-9 on Concrete and Concrete Aggregates," the "Report of the Joint Committee on Specifications for Concrete and Reinforced Concrete," and the paper by R. W. Carlson on "Chemistry and Physics of Concrete Shrinkage."

It is expected that Committee C-7 on lime will hold a meeting concurrently. L. S. Trainor of the National Lime Assn. staff is secretary of the Lime Committee.

Tentative revision of specifications for regular lime and hydrated lime for structural purposes and a proposed new specification for physical tests of lime are under consideration. The committee is also considering a specification for hydraulic lime for structural purposes. The "Classification of Hydrated Limes by a Mobilometer," prepared by T. G. Dickson and James R. Withrow of Ohio State University, will be presented at the Detroit meeting.

An exhibit of testing apparatus will feature special instruments and apparatus developed by A.S.T.M. committees and various research laboratories.

New Sand, Gravel Plant Completed in Illinois

★ The recently organized Geneseo Sand and Gravel Co. has completed the installation of excavating machines, screens and washers at Penny Slough, near Geneseo, Ill., and will begin operations shortly. The company is composed of John Bollen, B. E. Sommers and Charles H. Atwood, and is located at Geneseo.

Iowa Producer Opens New Pit for Large Contract

★ A contract for 100,000 cubic yards of washed gravel was awarded to the Concrete Materials Corp., of Waterloo, Iowa, by the Chicago Great Western railroad. The company will take the gravel from the railroad company's gravel pit at Byron, Ill.

T. E. Rust, Waterloo, vice-president and general manager of the Concrete Materials Co., is in charge of the installation of the machinery at the Byron pit. Gravel will be taken from the pit by a 10-inch suction pump after being loosened by a digging arm. Walter W. Roberts will be in charge of the operations at the pit.

Blue Eagle Revoked for Assessment Nonpayment

A Pennsylvania producer of material under the crushed-stone, sand-and-gravel and slag industries' code had his Blue Eagle revoked on May 3 by the National Recovery Administration for the nonpayment of assessments levied by the Code Authority. The decision was considered as proving that an obligation to pay such assessments possesses the same enforceability as a code requirement as do other provisions dealing with labor and marketing.

New So. Carolina Gravel Plant Erection Completed

★ The Columbia Sand & Gravel Co. has completed the construction of a new plant at Kathwood, S. C. New equipment installed includes a Pioneer shaker screen, an 8-in. Amsco pump, several Caterpillar Diesel engines, etc.

To Recommend Aggregate Sizes for Bituminizing

The Joint Technical Committee of Mineral Aggregates Associations, consisting of representatives of the National Crushed Stone Assn., the National Sand & Gravel Assn., and the National Slag Assn., has been studying during the past two or three years the development of standard sizes for aggregates and the securing of their adoption by engineering groups. The specifications of several states, highway departments, and national engineering bodies have been based on its recommendations.

Recently the committee has coöperated with representatives of bituminous-material manufacturers in amplifying its list of sizes to include sizes and gradings particularly applicable to bituminous mixtures. That work is about completed and the committee's recommendations should be released within a very short time.

Virginia Producer Adds Stone-Sand Department

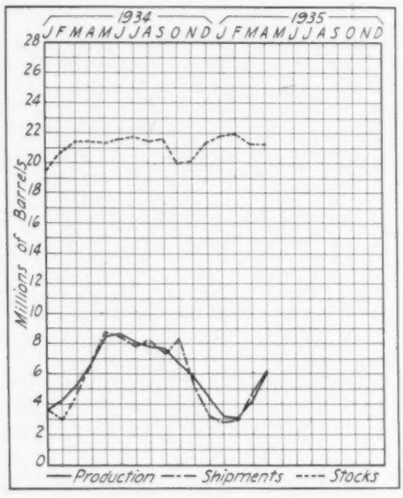
★ The Blue Ridge Stone Corp., Blue Ridge, Va., recently improved its crushed stone plant by the installation of a Tyler Niagara screen, an Ingersoll-Rand pump and other equipment. A new stone sand department was also completed with an Allis-Chalmers Pulverator, Aerovib screen, double-screw classifier, etc.

★ The Hersey Gravel Co., Hersey, Mich., has installed a 3- by 8-ft. double-deck Selectro screen made by the Productive Equipment Corp.

Cement Production Slightly Under 1934

SHIPMENTS EXCEED PRODUCTION

The Portland cement industry in April, 1935, produced 6,136,000 bbl., shipped 6,196,000 bbl. from the mills, and had in stock at the end of the month 21,229,000 bbl. Production and shipments of Portland cement in April, 1935, showed decreases, respectively, of 6.2 and 4.6 per cent. as compared with



Portland-cement production, shipments and stocks by months in 1934 and the first four months of 1935

April, 1934. Portland cement stocks at mills were 1.5 per cent. lower than a year ago.

The statistics here given are compiled from reports for April, received by the Bureau of Mines, from all manufacturing plants except one, for which estimates have been included.

The mill value of the shipments—10,676,000 bbl.—in the first quarter of 1935, is estimated as $16,513,000. According to the reports of producers the shipments totals for the quarter include approximately 304,000 bbl. of high-early-strength Portland cement with an estimated mill value of $584,000.

Roofing-Granule Plant Moved to New Location

The J. B. Preston Co. of Ely, Minn., are moving the machinery from their plant at Pipestone, Minn., to Saint Croix Falls, Wis., where the company will locate its plant near the Trap Rock Co. crushing plant. The Preston Co. will purchase crushed rock from the Trap Rock Co., and recrush the rock to granules. The granules will be colored and shipped to manufacturers of roofing.

★ The Basalt Rock Co. of Napa, Cal., will develop its properties in Vallejo, Cal. The firm plans the erection of a dock, 160 feet long and the erection of rock bunkers. The company has also purchased additional land in the vicinity of its improvements.

National Lime Assn. Plans Safety Program

FIRST CONTEST BEGINS JULY 1

A program for the promotion of safe operations in the lime industry has been formulated by the National Lime Assn. The objective, as Norman G. Hough, the association's president and general manager, states it, is to have "no accidents and no injuries from this time on." The program has been under consideration for a long time and the details have been very carefully worked out. Enrollment blanks, which have been sent to lime manufacturers, are to be filled out and sent direct to the Bureau of Mines, Washington, D. C., which will also receive injury reports and will coöperate with lime manufacturers and the lime association in other ways. The competition begins on July 1 and extends until December 31. Subsequent contests will be for full yearly periods. Trophies will be awarded to the plants that achieve the best safety records during the period of the contest. The rules follow:

1. *Trophies Awarded.*—The National Lime Assn. will award trophies for the best safety record established during the last 6 months of 1935 to the winning plant in each of two groups: (1) Lime plants employing less than 50 men, and (2) lime plants employing 50 men or more. For classification as to size, the number of employees shall be the average number for any monthly-reporting periods aggregating 75 days, or, if the plant was active less than 75 days, for such monthly-reporting periods as the plant was in operation.

2. *Eligibility.*—All lime-manufacturing plants are eligible to compete for these trophies. To maintain eligibility for the trophy the plant must be active at least 75 days during the contest period.

3. *Contest Period.*—July 1 to December 31, 1935.

4. *Scope of Contest.*—The contest covers accidents and man-hours worked underground or in the quarry or pit, also at surface shops and yards *including crushing and screening plants* at the mine or quarry or pit, and all work in and around the lime plant including lime-burning operations. Where a separate department is maintained for production of other than lime products, such department may be excluded from the contest if so desired, and if by permission of the Bureau of Mines whose judgment shall be final upon all questions of overlapping activities.

5. *Separate Enrollment of Each Plant.*—A separate enrollment application should be filed for each mine or quarry. A company may select one or more of its plants for entry in the contest.

6. *The Winners.*—The winner in each of the above groups will be the lime plant having the lowest accident-severity rate, that is, the smallest loss of time from all fatal, permanent, and lost-time injuries per 1,000 man-hr. worked.

7. *Reports Required.*—

(a) *Accident Reports.* — Competing companies agree to send to the United States Bureau of Mines a separate and full report of each lost-time accident. (A lost-time accident is defined as one that causes disability beyond the remainder of the day on which the accident occurred. This also covers injuries that do not incapacitate an employee for work until some time in the future; *e.g.*, as the result of infection.) All fractures or permanent injuries should be reported *even if no time is lost;* also all temporary injuries that prevent an employee from performing his *regular duties*, even though during convalescence the injured employee returns to lighter work. Companies may use accident report forms supplied by the Bureau of Mines or they may send the Bureau a copy of their reports to the state commission or their insurance carriers. Each accident report should show date of injury, date that disability begins, date of ability to resume work, the number of calendar days of the injured employee's disability, and a description of the accident. In counting the number of calendar days of disability the day of injury should not be counted. The plant's enrollment or entry number should be shown on each accident report.

(b) *Exposure Reports.*—The number of man-hours of employment or exposure should be reported on forms supplied by the Bureau of Mines; this includes man-hours of exposure of service or maintenance men on days when mine or quarry was not producing.

(c) *Completeness and Accuracy.*—Company reports are to be summarized by the Bureau of Mines at the close of the year and the summarization mailed to the company, the company to certify same as to completeness and accuracy and return the report to the Bureau of Mines.

8. *When to Send Reports.*—Accident reports are to be mailed to the Bureau of Mines, Washington, D. C., monthly. Supplemental reports may be submitted when the injured employee returns to work or when disability ceases during a month subsequent to the time of the accident. *Final reports must be mailed before January 31, 1936*, so that the winners of the contest may be announced early in the year. Company will estimate number of days of disability if disability is expected to continue beyond January 31, 1936. Reports of man-hours worked are to be mailed monthly.

8. *Methods of Rating.*—Lime plants will be rated according to their accident-severity rates, that is, according to the number of calendar days of personal disability from injuries per 1,000 man-hr. worked by all employees (except office workers) at the mine or quarry and at the surface plant. Deaths and permanent disabilities are weighted according to the scale shown in the table. Temporary disabilities are weighted according to actual calendar days of disability, including Sundays, holidays, and days on which the plant was idle, if the injured employee was physically unable to work on those days. The severity rate is obtained by dividing the total number of days of disability from accidents by the total number of man-hours worked and multiplying the quotient by 1,000.

Scale of Time Losses for Weighting Deaths and Permanent Injuries So As To Show Severity of Accidents

Nature of Injury	Degree of Disability	Days Lost
Death	100	6,000
Permanent total disability	100	6,000
Arm above elbow, dismemberment or loss of use of	75	4,500
Arm at or below elbow, dismemberment or loss of use of	60	3,600
Hand, dismemberment or loss of use of	50	3,000
Thumb, dismemberment or loss of use of	10	600
Any 1 finger, dismemberment or loss of use of	5	300
2 fingers, dismemberment or or loss of use of	12½	750
3 fingers, dismemberment or loss of use of	20	1,200
4 fingers, dismemberment or loss of use of	30	1,800
Thumb and 1 finger, dismemberment or loss of use of	20	1,200
Thumb and 2 fingers, dismemberment or loss of use of	25	1,500
Thumb and 3 fingers, dismemberment or loss of use of	33⅓	2,000
Thumb and 4 fingers, dismemberment or loss of use of	40	2,400
Leg above knee, dismemberment or loss of use of	75	4,500
Leg at or below knee, dismemberment or loss of use of	50	3,000
Foot, dismemberment or loss of use of	40	2,400
Great toe, or any 2 or more toes, dismemberment or loss of use of	5	300
1 toe, other than great toe, dismemberment or loss of use of	0	....
1 eye, loss of sight	30	1,800
Both eyes, loss of sight	100	6,000
1 ear, loss of hearing	10	600
Both ears, loss of hearing	50	3,000

Temporary disabilities are weighted according to actual calendar days of disability, including Sundays and holidays as stated in Rule 9. Hernia is classed as a temporary disability to be charged with the actual number of calendar days which the employee was unable to work.

* In percentage to total disability.

10. *Award of Trophies.*—The winning companies will be certified to the National Lime Assn. by the Bureau of Mines. The winners will be announced at the annual convention of the association and awards will be made at the plants.

11. *Miscellaneous.*—The above rules shall govern the contest during 1935. The rules for subsequent years may be revised as experience shows to be advisable.

12. *Records Confidential.*—Records will not be published in such a way as to reveal the identity of an individual plant, unless the plant wins a trophy, in which case the record will be published as a credit to the company, except that outstanding safety records may be published for plants operating two or more years without accidents or with unusually low accident rates. Records of other individual plants shall be inspected only by representatives of the Bureau of Mines or the National Lime Assn., and in no case will individual reports be available to competitors.

13.—*Interpretation of Rules.*—Interpretation of any of the rules of this contest shall be by the Bureau of Mines, whose decisions shall be final.

14. *Definition of Accident Rates.*—

Frequency rate means the number of all injuries (fatal, permanent, and temporary lost-time injuries) per 1,000,000 man-hr. of exposure.

Severity rate means the number of days of disability resulting from all injuries (fatal, permanent, and temporary lost-time injuries) per 1,000 man-hr. of exposure.

Census Bureau Issues Construction Cost Data

43.8 PER CENT. FOR MATERIALS

The Bureau of the Census in its figures for 1930, based on information gathered from 26,671 firms doing more than 5½ billions of dollars of construction business in the year 1929, indicate that for all classes of construction 43.8 per cent. of the total contract cost was spent for material, 30.7 per cent. for labor wages, 7.4 per cent. for salaries, 10.6 per cent. for general overhead and plant charges, and 7.5 per cent. for unclassified expense and profit. In the case of all building construction it was found that 43.7 per cent. of the total cost went for materials, while in the case of highways 41.8 per cent. went for materials. Of the total sub-contractors' expense on building work it is interesting to note that 34.8 per cent of the material cost went for concrete.

Eastern Producer Plans New Plant in Virginia

★ According to reports, the Standard Lime and Stone Co. of Baltimore, Md., will erect a new crushed stone plant near Strasburg, Va. W. J. Flanagan, superintendent of the former plant of the Standard Lime & Stone Co. located at Strasburg, states the new plant will quarry stone for shipment to steel producers.

★ The Toledo Stone & Glass Sand Co., Silica, O., has purchased a Marion 450 gas-electric shovel.

Announce Allotments For P.W.A. Road Work

$400,000 FOR ROADS AND CROSSINGS

The Advisory Committee on allotments for the Works Program has recommended an allotment of $400,000,000 for highway and grade-crossing work. One-half of this amount, $200,000,000, is proposed for highways, roads and streets and one-half for highway-railway grade-separation and protection. In addition, $100,000,000 was recommended for use to cover previous obligations under the Hayden-Cartwright Act. Final disposition of this allotment requires the approval of the President and the official allocation of the funds by the Secretary of Agriculture. Favorable action is expected within a very short time. The act provides for the expenditure of as much as $800 000,000; the availability of the remainder of the appropriation will depend upon the rapidity with which the present allotment is used. That all, or practically all, the funds will be spent through the regular contract system seems definitely assured; they are required to be expended by the state highway departments under the provisions of the Federal Highway Act. Regulations governing the work are in preparation and it is expected that they will be available soon. Wage rates announced will not apply, necessarily, to highway construction; the labor regulations will be under the jurisdiction of the Bureau of Public Roads, as was the case for the last appropriation.

The apportionment of funds is given in the accompanying table.

Washington Cement Plant Making Many Betterments

★ Improvements which will represent an investment of over $50,000 are being made to the plant of the Lehigh Portland Cement Co. at Metalline Falls, Wash., to take care of the cement for the Grand Coulee Dam and other construction work. Contracts have been let for the erection of 12 reinforced concrete blending silos. According to W. G. Perrow, district manager for the company, additional tube mills will be installed and other improvements made to permit the manufacture of early-strength cement. The improved plant is expected to be in operation in June.

Illinois Quarry Uses 30 Tons Explosive in Blast

On April 29, a large dynamite blast was detonated at the quarry of the Casper Stolle Quarry and Contracting Co. at Falling Springs, Ill. Thirty tons of dynamite were used in the blast and Harvey Foster, general superintendent of the company, estimated that from 100,000 to 150,000 tons of stone were loosened.

Rebuilding of New Jersey Lime Plant Is Completed

★ The Limestone Products Corp. of America, Newton, N. J., has completed the rebuilding of its plant near that city.

Mississippi Gravel Plant Sold to Former Lessors

Waters & McCary have purchased the properties and equipment of the New Hope Gravel Co., Columbus, Miss. Waters & McCary had previously leased the properties of the New Hope Gravel Co. Main offices of the company will be located in the Odd Fellows Building in Columbus.

★ The South Carolina Granite Co., recently installed two Allis-Chalmers vibrating screens in its plant at Columbia, S. C.

★ The American Aggregates Corp. has installed a Greenville roll crusher in its plant at Richmond, Ind.

Residential Building Permits Continue Gain

APRIL AWARDS EXCEED MARCH

Residential building continues to reflect encouraging improvement. For the initial half of May, contracts let for this class of construction were approximately 80 per cent. ahead of the total shown in the corresponding period of May 1934. For the 37 states east of the Rocky Mountains F. W. Dodge Corp. reported a residential building total of $22,072,500 for the first 15 days of May.

The contract total for all classes of construction inclusive of residential building amounted to $60,961,300 for the initial half of May as against $61,969,900 for the first half of April and $67,181,400 for the first 15 days of May 1934, the Dodge organization reports.

The April construction contract volume exceeded the total for March by a small margin. A loss from the volume reported for April of last year was shown, however, due to a falling-off in awards under the old PWA program. April contracts totaled $124,098,000 as against $122,940,500 for March and $131,157,000 for April, 1934.

Despite the loss from a year ago in total construction residential building contracts during April were higher than for any other month since the closing months of 1931. Private construction in April as apart from public work, made the best showing in more than three years with one exception.

Gains in residential building were shown in April in each of the principal geographic territories as compared with last year except for the New England and the New Orleans areas. Residential contracts let during the first four months of 1935 in the 37 states totaled $113 517,200 as against only $80,342,500 for the corresponding four months of 1934.

APPORTIONMENTS FOR HIGHWAYS, ROADS, AND STREETS, AND HIGHWAY-RAILWAY GRADE SEPARATION AND PROTECTION, UNDER THE PROVISIONS OF THE EMERGENCY RELIEF APPROPRIATION ACT OF 1935.

State	Highways, Roads, and Streets	Highway-Railway Grade Separation and Protection	Total	Unappropriated Balance*	Grand Total	State	Highways, Roads, and Streets	Highway-Railway Grade Separation and Protection	Total	Unappropriated Balance*	Grand Total
Alabama	$ 4,151,115	$ 4,034,617	$ 8,185,732	$ 2,129,921	$ 10,315,653	New Hamp.	$ 945,225	$ 822,484	$ 1,767,709	$ 484,731	$ 2,252,440
Arizona	2,569,841	1,256,099	3,825,940	1,320,967	5,146,907	New Jersey	3,129,805	3,983,826	7,113,631	1,610,440	8,724,071
Arkansas	3,352,061	3,574,060	6,926,121	1,714,024	8,640,145	New Mexico	2,871,397	1,725,286	4,596,683	1,470,850	6,067,533
California	7,747,928	7,486,362	15,234,290	3,966,103	19,200,393	New York	11,046,377	13,577,189	24,623,566	5,663,961	30,287,527
Colorado	3,395,263	2,631,567	6,026,830	1,743,003	7,769,833	N. Carolina	4,720,173	4,823,958	9,544,131	2,420,471	11,964,602
Connecticut	1,418,709	1,712,684	3,131,393	727,434	3,858,827	N. Dakota	2,867,245	3,207,473	6,074,718	1,469,484	7,544,202
Delaware	900,310	418,239	1,318,549	461,697	1,780,246	Ohio	7,670,815	8,439,897	16,110,712	3,932,506	20,043,218
Florida	2,597,144	2,827,883	5,425,027	1,330,671	6,755,698	Oklahoma	4,580,670	5,004,711	9,585,381	2,342,590	11,927,971
Georgia	4,988,967	4,895,949	9,884,916	2,556,745	12,441,661	Oregon	3,038,642	2,334,204	5,372,846	1,548,907	6,921,753
Idaho	2,222,747	1,674,479	3,897,226	1,138,743	5,035,969	Pennsylvania	9,347,797	11,483,613	20,831,410	4,795,394	25,626,804
Illinois	8,694,009	10,307,184	19,001,193	4,460,700	23,441,893	Rhode Island	989,208	699,691	1,688,899	507,286	2,196,185
Indiana	4,941,255	5,111,096	10,052,351	2,544,481	12,596,832	S. Carolina	2,702,012	3,059,956	5,761,968	1,385,477	7,147,445
Iowa	4,991,664	5,600,679	10,592,343	2,559,180	13,151,523	S. Dakota	2,976,454	3,249,086	6,225,540	1,523,822	7,749,362
Kansas	4,994,975	5,246,258	10,241,233	2,558,837	12,800,070	Tennessee	4,192,460	3,903,979	8,096,439	2,151,496	10,247,935
Kentucky	3,726,271	3,672,387	7,398,658	1,909,155	9,307,813	Texas	11,989,350	10,855,982	22,845,332	6,145,627	28,990,959
Louisiana	2,890,429	3,213,467	6,103,896	1,481,966	7,585,862	Utah	2,067,154	1,230,763	3,297,917	1,066,346	4,364,263
Maine	1,676,799	1,426,861	3,103,660	855,793	3,959,453	Vermont	924,306	729,857	1,654,163	474,004	2,128,167
Maryland	1,750,738	2,061,751	3,812,489	905,029	4,717,518	Virginia	3,652,667	3,774,287	7,426,954	1,882,694	9,309,648
Massachusetts	3,262,885	4,210,833	7,473,718	1,675,237	9,148,955	Washington	3,026,161	3,095,041	6,121,202	1,553,206	7,674,408
Michigan	6,301,414	6,765,197	13,066,611	3,226,284	16,292,895	W. Virginia	2,231,412	2,677,937	4,909,349	1,140,168	6,049,517
Minnesota	5,277,145	5,395,441	10,672,586	2,712,775	13,385,361	Wisconsin	4,823,884	5,022,683	9,846,567	2,470,919	12,317,486
Mississippi	3,457,552	3,241,475	6,699,027	1,770,113	8,469,140	Wyoming	2,219,155	1,360,841	3,579,996	1,143,856	4,723,852
Missouri	6,012,652	6,142,153	12,154,805	3,086,870	15,241,675	Dist. of Col.	949,496	410,804	1,360,300	474,889	1,835,189
Montana	3,676,416	2,722,327	6,398,743	1,884,867	8,283,610	Hawaii	926,033	453,703	1,379,736	486,921	1,866,657
Nebraska	3,870,739	3,556,441	7,427,180	1,982,182	9,409,362	Eng.&Adm.Res	5,000,000	4,000,000	9,000,000	.....	9,000,000
Nevada	2,243,074	887,260	3,130,334	1,151,178	4,281,512	Totals	$200,000,000	$200,000,000	$400,000,000	$100,000,000	$500,000,000

*Covered by the $100,000,000 Hayden-Cartwright Act.

Prescribe Wage Rates For Works Program

130-HOUR MONTH GIVEN LABOR

Under the authority given him by the Administration's Relief Appropriation Act of 1935, President Roosevelt has prescribed a schedule of wages to be paid throughout the United States for work done in connection with the Works Program. The country has been divided into four regions, the first including Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont in the East; Illinois, Indiana, Michigan, Minnesota, Ohio and Wisconsin in the Middle West; and Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington and Wyoming in the West. Region 2 embraces Delaware, the District of Columbia, Maryland and West Virginia in the East; and Iowa, Kansas, Missouri, Nebraska, North Dakota and South Dakota in the Middle West. Region 3 comprises Arkansas, Kentucky, Louisiana, Oklahoma, Texas and Virginia. Region 4 includes Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina and Tennessee.

The rates for unskilled work range from $40 for cities under 5,000 population to $55 in cities over 5,000 population in Region 1; from $32 to $45 in Region 2; from $21 to $35 in Region 3; and from $19 to $30 in Region 4. For intermediate work the corresponding ranges are $45 to $65, $38 to $58, $30 to $52, and $27 to $49. For skilled work the corresponding ranges are from $55 to $85, $44 to $72, $38 to $68, and $35 to $68. For professional and technical work the corresponding ranges are $61 to $94, $48 to $79, $42 to $75, and $39 to $75.

The maximum hours of work have been set up as 8 per day and 40 per week for those on a salary basis, and as 8 per day and 130 per month for persons employed on projects under the supervision of the Federal Administration of Public Works, or the Bureau of Public Roads and State Highway Departments on manual labor. The hours for clerical and other non-manual employees are 8 per day and 40 per week. Where camps and floating plants are necessary the maximum hours are 8 per day and 40 per week.

No person under 16 years of age and no one whose age or physical condition makes his employment dangerous to his health or safety or to the health or safety of others is to be employed on any project. Preference in employment is to be given to persons on the public relief rolls, from which 90 per cent. of all the workers on a work project must be taken.

Non-Commercial Aggregate Production Gains

The U. S. Bureau of Mines has been making an intensive study of the products of the sand-and-gravel industry produced by the commercial and non-commercial producing agencies. The results of the investigation, which has been carried back to 1928, are shown on the accompanying chart which gives the production and value of the sand-and-gravel output of the United States since 1902. The curve shows a steady upward trend in non-commercial production. This has come at a time, sand-and-gravel producers point out, when the competition was most harmful to the established industry. Inasmuch as returns on non-commercial production in recent years have been more complete than in former years the curve is perhaps more rapid in its rise than would be indicated by a complete check for each of the years involved.

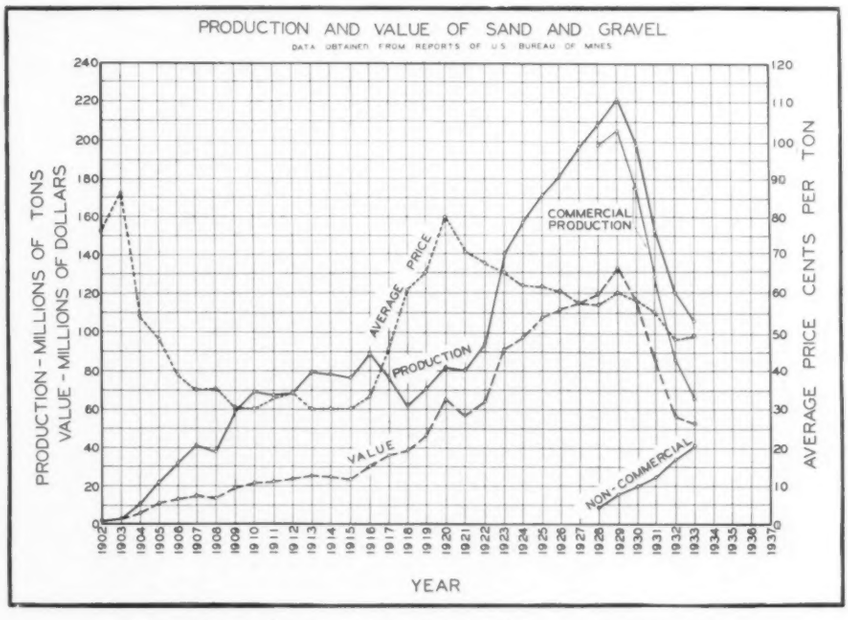


Chart giving production and value of sand and gravel output since 1902.

Aggregates NRA Body Favors Voluntary Codes

ADMIT LABOR, TRADE BENEFITS

At a meeting of the Executive Council of the Code Authority of the Crushed Stone, Sand and Gravel and Slag Industries in Washington on June 3 it was decided, in view of the Supreme Court opinion invalidating the N. R. A. and depriving the Code Authority of its official status, to liquidate the funds in the Code Authority's hands.

After the meeting the code authorities chairman, Otho M. Graves, issued the following statement:

After mature consideration of conditions within the industries, it is the earnest opinion of the council that the present session of Congress should not adjourn without enactment of legislation which will permit of industry codification and which will not be subject to the objections voiced by the Supreme Court toward the National Industrial Recovery Act. The council is impressed by the fact that a suitable system of voluntary codes will appeal to the crushed-stone, sand-and-gravel, and slag industries, and this is particularly so in the case of these industries since adequate enforcement may be obtained through appropriate action by the Federal government in exacting compliance with voluntary codes in the purchasing of materials for use on the public-works program. There is the further consideration that, since a substantial portion of the operation of our industries is largely intrastate, the state legislatures could enact legislation for application within such states which would permit of state codes, compliance therewith being compelled on projects financed from sources other than the Federal government.

It is the opinion of the Executive Council that the labor provisions of the code have not been oppressive to the individual producer and that their legal enforcement had an important effect in bringing about industry stabilization. The council recognizes, however, that compliance with the labor provisions of the code was made possible only by those other code provisions which placed industry members in a position to shoulder the extra burdens growing out of increased labor costs. For that reason the council is hopeful that some effective instrumentality can be devised by the Federal government, or by state governments acting in conjunction with the Federal government, which will permit our industries to maintain the progress achieved during operation of the code. In the judgment of the council it would be most unfortunate if our industries abandoned all code provisions and, while appreciating that willingness and ability to compensate labor are not necessarily coincidental, they seek the coöperation of all members of the industries in maintaining intact the present labor provisions of the code. This suggestion applies with equal force to the trade-practice provisions of the code. They have taught our industries that price wars and unfair trade practices are destructive of industry stability and are of no real benefit to the public. The council believes that the industries are mindful of this consideration, and it hopes that the industries as a whole will concur in its judgment.

The Peapack Lime Co. has completed the erection of a storage building near its quarry at Plainfield, N. J. The building has a capacity of 1,000 tons of lime.

Editorial

After the N. R. A.

WITH the decision of the United States Supreme Court in the Schechter case—already more popularly known as the decision invalidating the National Recovery Administration and its many works—no one cognizant of the legal questions involved should have any quarrel. It may not have coincided with his political beliefs nor with his economic and social theories of reconstruction, but these questions did not apparently influence the judges, whose opinion, besides being unanimous, was directed solely to the legal points raised. This is as it should be, for, in the consideration of the legality of an issue so important as the one raised by this case, extraneous matters, such as sentiment, regard for political affiliations or overly-nice consideration for the effect of the decision on public opinion, have no place under our law. To the Supreme Court our Constitution delegates the sole right of determining the constitutionality of laws enacted by our legislators and it is the duty of its members to view all such questions legalistically and judicially. That they did so in this case should be evident to everyone familiar with the problem and the decision. Interpretation, whenever it entered into the decision, did not play the significant part which many had hoped or feared it would. The opponents of the "new deal" should be, and doubtless are, as well satisfied as its proponents are displeased. To the student of industrial and social conditions the decision appears to be just what it is and no more, a legal opinion—direct, conclusive and unanimous—dealing with problems purely legal.

As a nation we are still faced with the questions raised by the depressed economic conditions of recent years—unemployment, wage and hours-of-labor regulation, the control of destructive methods of competition in business, the elimination of the threat of overexpansion that exists in industry as a threat to present capital investment, and the many other problems that contributed in various degrees to the creation of the "emergency" conditions which, in the words of the Supreme Court's decision, "do not create or enlarge constitutional power." It will obviously be necessary to approach the solution of these problems on different grounds, if remedial measures are to be kept within the unavoidably narrow confines of constitutionality.

That something of this kind will be done is too apparent from the latest statements of administration spokesmen and from the often expressed wishes of prudent business men and other citizens to be reasonably questioned. Despite their unconstitutionality, many of the provisions contained in the codes of fair competition written under the authority of the National Industrial Recovery Act have been approved by men who had no sympathy for or belief in its policies developed in other directions, and there is a strong feeling in many quarters that most of the gains made should be preserved. Some kind of control over wages, hours of labor, working conditions, child labor and industrial relations, as well as some checks on overexpansion and unfair trade practices and some means of averting destructive price wars and the competitive methods that follow them, appear to be earnestly wished for by large groups of business men.

To accomplish these things, Congress will be forced to give greater study to proposed measures and to be more specific in defining the powers conferred by it upon the President and governmental agencies. With reference to the delegation of law-making power to the executive branch of the government the Supreme Court's decision says in part, "The Congress is not permitted" [by the Constitution] "to abdicate or to transfer to others the essential legislative functions with which it is thus vested." While the authority of Congress to declare certain unfair trade practices to be unlawful, as is evidenced by Section 5 of the Federal Trade Commission Act, is held to be proper by the decision, a blanket authority to promulgate codes embodying other provisions—such as those relating to the wages and hours of labor—is held to be without constitutional authority.

According to the decision, Section 3 of the recovery act which was intended to empower the President to impose conditions "for the protection of consumers, competitors, employees and others, and in furtherance of the public interest," is without precedent, because "it supplies no standards for any trade, industry or activity."

ON that part of the decision of the Supreme Court with respect to what is and what affects interstate commerce there is likely to be much divergence of opinion. On one extreme will be found those who contend that no form of present-day business in one state is without its effects on the same type—and even possibly other types of business—in another state, while their opponents may claim that only a very few businesses have such effects and then only when the commodities involved move in a continuous flow from one state into or across another. The court's opinion favors the stricter interpretation, holding that intrastate transactions which affect interstate commerce only "indirectly" are not the proper subjects of federal legislation. "If the federal government may determine the wages and hours of employees in the internal commerce of a state, because of their relation to cost and prices and their indirect effect upon interstate commerce, it would seem that a similar control might be exerted over other elements of cost, also affecting prices, such as the number of employees, rents,

advertising, methods of doing business, etc.," says the opinion. "All the processes of production and distribution that enter into cost could likewise be controlled. If the cost of doing an interstate business is itself the permitted object of federal control, the extent of the regulation of cost would be a question of discretion and not of power." The decision referred to the government's attempt to regulate labor conditions in intrastate commerce throughout the country as "overriding the authority of the states to deal with domestic problems arising from labor conditions in their internal commerce."

THE court left no doubts concerning its determination to confine its considerations to questions of law when it said, "It is not the province of the court to consider the economic advantages or disadvantages of such a centralized system. It is sufficient to say that the federal constitution does not provide for it. Our growth and development have called for wide use of the commerce power of the federal government in its control over the expanded activities of interstate commerce, and in protecting that commerce from burdens, interferences, and conspiracies to restrain and monopolize it. But the authority of the federal government may not be pushed to such an extreme as to destroy the distinction, which the commerce clause itself establishes between commerce 'among the several states' and the internal concerns of a state."

So it is obvious that those who would better some of the conditions which the National Industrial Recovery Act sought to improve must move in different directions to attain their ends. That these objectives were worthy objectives many business men still believe and it is likely that, wholly apart from any initiative that may be shown by the President or Congress in proposing new legislation to take the place of the invalidated N. R. A., industry in America will take upon itself the task of framing a substitute program that will meet, or perhaps circumvent, the conditions of constitutionality laid down by the Supreme Court. As far as our own industries are concerned, their attitude has been clearly expressed by the extent to which they have conscientiously tried to conform to code provisions, as well as by letters which individual members of them have lately written for publication on the broad question of whether the government's industrial-recovery program should be extended.

In the prevalence of child labor before N. R. A. codes became effective many business men, who made no claim to holding anything but "practical" views on the subject, found cause for protest. Many of them who employed children felt that they must oppose proposed state laws abolishing child labor as long as their competitors in other states were subjected to no restrictions. To these men the child-labor provisions of the codes seemed to offer a solution by providing centralized control of a problem that, until their adoption, had drifted without a check except for the mild pressure applied by humanitarians.

Under modern conditions labor is as fluid as commodities in its movements from state to state. Higher wages paid in one state may, and usually do, attract labor receiving lower wages in another state, so that the individual bidding of employers engaged in purely intrastate business may have a profound effect on the production costs of competitors and non-competitors in other states.

Unemployment—the chronic type as well as the acute—transcends the political markings that separate states, and its burdens can not be confined within the borders of any political subdivision. Unemployment has a direct and immediate effect on purchasing power and in a nation such as ours the ramifications of this power reach every important producing center of the country. Any serious curtailment of it affects regions far beyond the areas in which it may temporarily exist or begin its spread. It is a striking fact that serious local unemployment soon becomes a national problem that should be studied and solved, if possible, on a scale similarly broad.

Destructive competition in business is a force with which reputable business men have long been concerned. Before the coming of the N. R. A. codes they sought to reduce its terrors and high cost by coöperative action with the Federal Trade Commission through trade-practice conferences, and prior to that they had recognized the need for some type of legal protective machinery and tried to establish it in their trade associations. They are not inclined to abandon all these efforts toward the attainment of worth-while objectives because the first attempt at centralized and legalized control has been shown to be without constitutional sanction.

The maintenance of prices at levels far enough above the cost of production to leave a reasonable profit is the aim of every reasonable business man and one to which many price-cutters of ill repute have been won over under the friendly influences of code meetings. The spirit of these gatherings will continue to imbue those who seriously look forward to a better day for business of all kinds.

IT is difficult to believe that the decision of the United States Supreme Court withdrawing constitutional support from the structure of the National Recovery Administration will have much effect beyond the determination of the legal questions which it answered. The clarification of the constitutional issue seems to us to clear the way for more intelligent action on the part of business men themselves, who, acting preferably with, but if necessary without, the open coöperation of government, can do much through voluntary agreements to prevent a return to the desperate days that preceded the formulation of fair-practice codes. More sensible control of the economic destinies of this nation, whatever its form, is inevitable, and it is something which every business man having a true insight into his future self-interest will strive to attain. Meanwhile, we must try in every way to hold fast the gains that have been made, attempting also to add new ones whose advantages the experiences of the last few years have made plain to all.

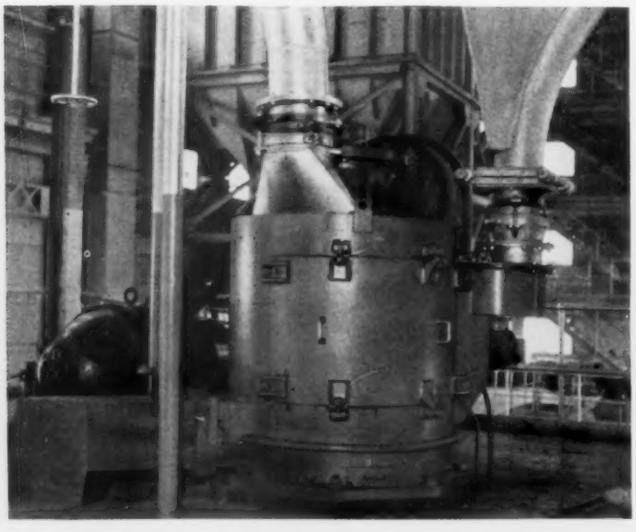
General view of operations of Kelley Island Lime & Transport Co. from quarry. Fine crushing and screening plant is in foreground and to the left behind it is Lime Plant B. To the right is the new roasted-dolomite plant.

Kelley Island Rotary-Kiln Plant at Clay Center Makes Burned Dolomite

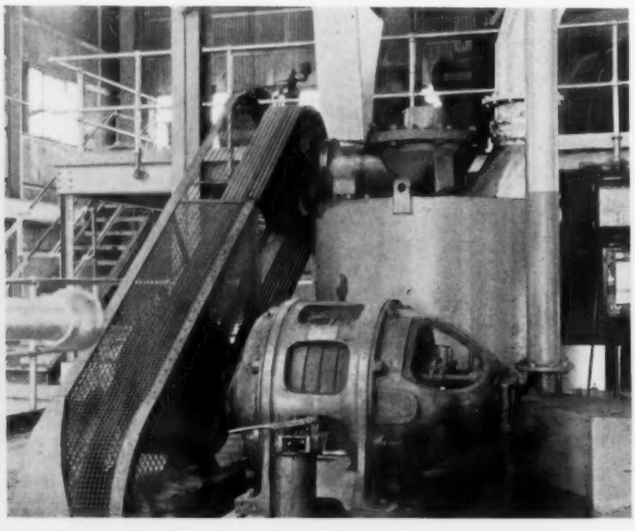
Modern Equipment for Pulverizing and Feeding Coal to Kilns is Used

THE latest step in the progressive improvement program being carried on by the Kelley Island Lime & Transport Co. at Clay Center, O., was the completion of its new refractory burned dolomite plant late in 1933. The product manufactured is a closely-sized raw dolomite having a maximum size of 3/8 in. and with the "fines" screened out; it is burned at a high temperature and stabilized by the addition of mill scale. This company was one of the first producers of this material, which gained wide usage when the importation of magnesite was suspended during the World War. After the war production was discontinued until this new plant was built.

The entire operation at Clay Center consists of a central primary crushing plant; four upright-kiln plants, known as plants B, C, D and E, with a total of 53 vertical kilns and a combined capacity of 500 tons of finishing hydrate daily; a fine crushing and sizing plant with a capacity of 140 tons per hr. of commercial material from 2-in. to 100-mesh; and the new rotary-kiln plant. The latter plant can also produce finishing hydrate when desired and has a capacity of about 100 tons daily of this material. A

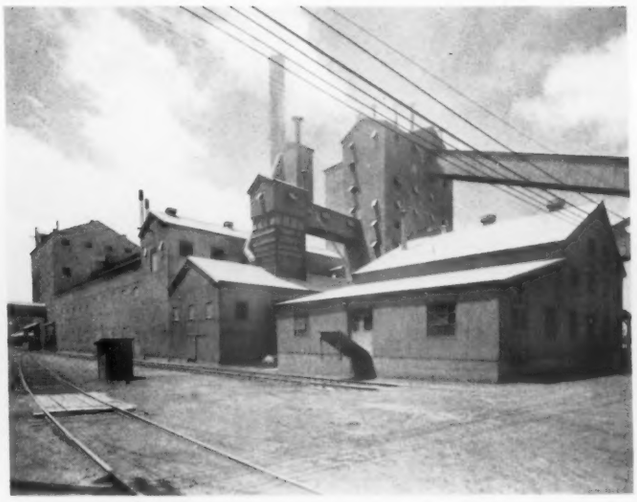


The direct-firing coal pulverizer which serves the large rotary kiln used for roasting dolomite refractory material.



Another view of direct-firing coal pulverizer with motor and guarded V-belt drive in foreground.

The rotary-kiln dolomite-roasting plant from the west. Fine screening plant is at left.



View from northeast showing rotary-kiln, fine-screening, drier, and limestone-dust plants.

new hydrating building for Lime Plant B was completed early in 1931, the screening and sizing plant late in 1931, and the rotary-kiln plant late in 1933. The latter plant has a gas producer which can be used when burning lime and a direct-firing coal pulverizer for burning dolomite refractory material.

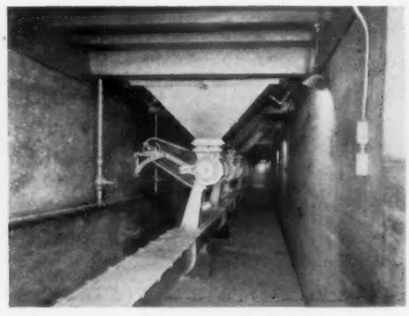
The deposit at Clay Center is a dolomite which has a very small percentage of impurities and is suitable for the manufacture of finishing hydrate, flux, chemical lime, burned dolomite and for commercial stone. Stone is quarried in the usual manner and is loaded by steam shovels into cars. These discharge the stone to the primary crushing plant, which is equipped with a set of Edison rolls and revolving screens. Three major sizes of stone are produced: 5-in. to 12-in. for the vertical kilns; 2½-in. to 5-in. for flux; and minus 2½-in. for the fine screening and crushing plant.

The new fine crushing and sizing plant was completely described in an article published in the Dec. 16, 1931, issue of PIT AND QUARRY. Because of the close connection between this plant and the new burned-dolomite plant, however, a brief description may give the reader a better idea of the operations.

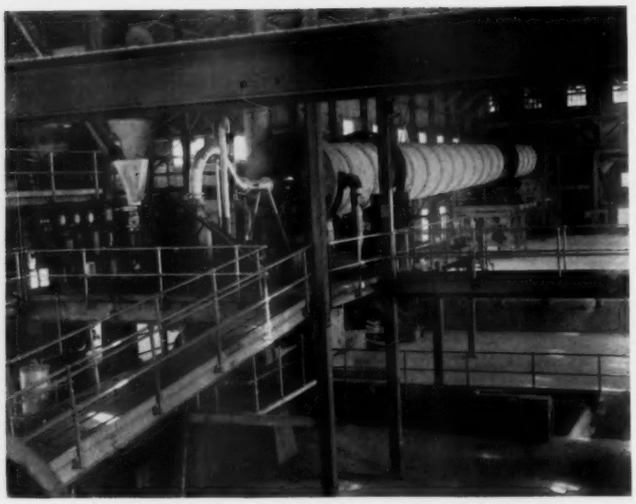
The raw material for this plant (2½-in. minus) is taken from bins at the primary crushing plant by a feeder and belt-conveyor to the "fines" plant. A second belt-conveyor feeds a single-deck vibrating screen which separates the minus 4-mesh material. Two triple-deck screens in sequence also remove the "fines" and separate other sizes. A 4-ft. cone reduction crusher can be used for further reduction of any desired coarse size.

The minus ⅜-in. material can be diverted to a 7-ft. by 40-ft. rotary drier which is fired with coke to prevent discoloration of the stone. The dried fine material is then fed by an elevator to two triple-deck screens which discharge their various-sized products into storage-bins. These screens produce 5-, 10- and 20-mesh sizes as well as the 5-mesh to ⅜-in. raw dolomite. The 5- and 10-mesh products are sold as ground stone. The minus-20-mesh material goes to two air-separators, one 6-ft. and one 8-ft. The fine dust from these units is sold as agstone (97 per cent. through 100-mesh) and the coarse goes to the 10-mesh material bin. The ⅜-in. to 5-mesh stone retained on the top decks of these two screens is carried by a 24-in. belt-conveyor to a 100-ton capacity steel bin in the kiln room.

The mill scale, which contains about 70 per cent. metallic iron and is used in the manufacture of the dolomite refractory, is received in hopper cars which come from rolling mills and discharge into a track hopper. A 28-in. by 16-ft. 6-in. manganese-steel pan conveyor feeds it to a 12-in. belt-bucket elevator operating on 72-ft. centers. The elevator discharges into a 100-ton steel ore bin alongside the 100-ton stone bin previously described. The pan conveyor and elevator are driven through gear



Views of the hydrating department of Lime Plant B of the Kelley Island Lime & Transport Co. at Clay Center, O. Left, feeders which reclaim hydrate from storage-silos; center, the two bag-packers; right, inclosed vibrating screen, conveyor and elevator.



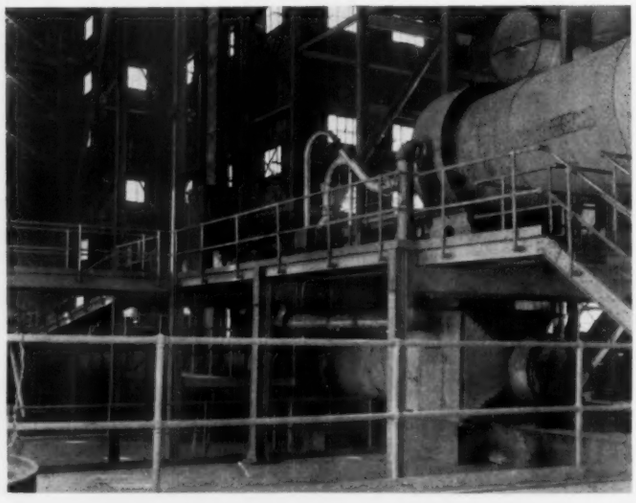
Interior of rotary-kiln plant with direct-firing coal pulverizer in foreground and rotary cooler below.

reducers by 5-hp. and 10-hp. motors, respectively.

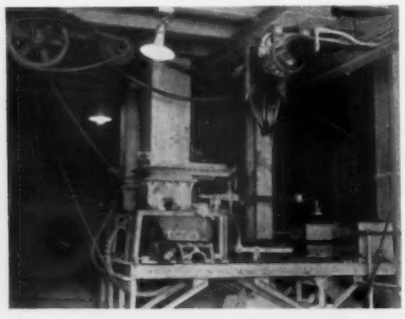
Two Poidometers with 14-in. belts on 6-ft. centers proportion the stone and ore from these bins so that the mixture contains about 3½ per cent. of ore. The Poidometers discharge to an 8-in. bucket-elevator which operates on 42-ft. centers and whose buckets empty their contents through a feed spout into the 8-ft. by 150-ft. rotary kiln.

Burning dolomite requires exceedingly high temperatures, with the result that the burning zone lining in a dolomite kiln is subjected to materially more severe service than burning-zone linings in rotary cement or lime kilns. At this plant the burning zone consists of a section 36 ft. long, starting 10 ft. from the discharge end of the kiln. This is lined with magnesite 6-in. by 9-in. brick laid lengthwise in the kiln. In spite of the high temperature this lining has already been in place a full year, during which time it has seen ten months of actual operating time in the face of several shutdowns. Seventy-per cent. alumina brick are used for the 10-ft. section between the magnesite brick lining and the discharge end of the kiln. They are also used for 39 ft. at the feed end of the magnesite-brick section. For the remainder of the lining, namely, 65 ft. starting at the feed end of the kiln, regular first-quality fire-clay brick are used.

The kiln is driven through V-belt and gears by a 40-hp. variable-speed slip-ring motor having a speed range of from 250 to 500 r.p.m. The feed to the kiln is automatically adjusted to the kiln speed by means of a 5-hp. transmitter on the kiln-motor shaft. This is connected to two 2-hp. receivers which operate the two Poidometers. The receivers drive the Poidometers through variable-speed reducers with a range of from 10:1 to 50:1, which allows any desired proportion or rate of feed. The motors run at double the speed of the transmitter.



Another view of kiln, coal pulverizer and cooler with one vertical section of bucket-conveyor in background.



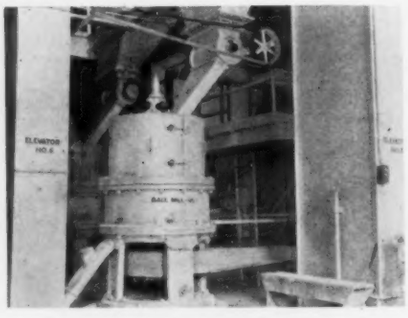
Weighing devices which proportion mill scale and stone to rotary kiln.

Coal for firing the kiln is received in hopper cars which discharge into a track hopper. A pan conveyor feeds it to a 12-in. bucket-elevator operating on 80-ft. centers. These are driven through speed reducers by 5-hp. and 20-hp. motors, respectively. A 16-in. screw conveyor, 60 ft. long and having an 8-in. pitch, delivers the coal to a 137-ton steel bin. This conveyor is driven from the head shaft of the elevator.

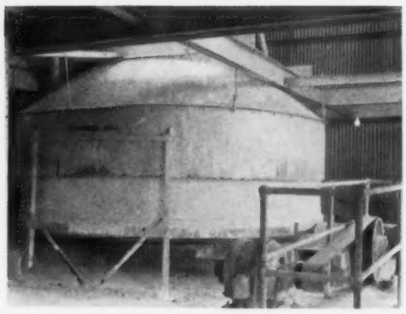
A spout feeds the coal to the coal mill through an integral heliocentric feeder driven by a ¾-hp. variable-speed motor through a gear reducer having a reduction of 700 to 1. The mill is driven by a 75-hp. synchronous motor with a 40-per cent. leading power factor, through a V-belt drive.

A fan, which is V-belt-driven from the same motor and pulley as the mill, draws hot air from the kiln hood at a temperature of

Pan conveyor which carries mill scale from track hopper to storage.



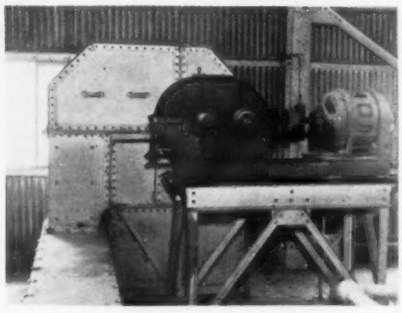
The two 33-in. grinding mills in hydrating section of Lime Plant B.

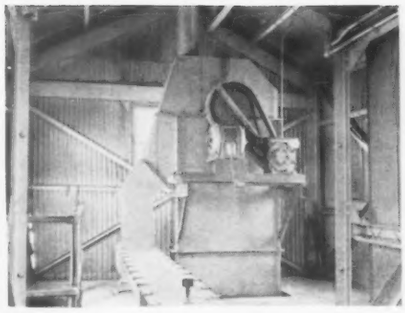


Left.—One of the two batch hydrators in Lime Plant B.

Below.—Speed-reducer drive of elevator in rotary-kiln plant.

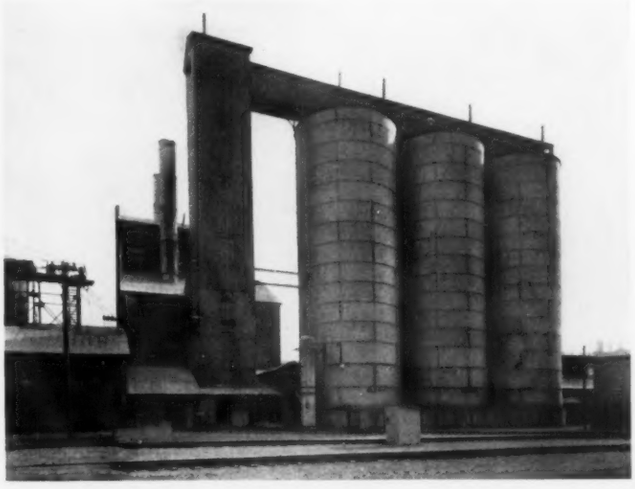
Right.—Elevator and screw conveyor in Lime Plant B.





400 to 500 deg. F. to dry the coal while grinding. The same blast blows the pulverized coal into the kiln with an air temperature of about 160 deg. F. Part of the secondary air is introduced through a by-pass from the fan at whatever velocity is desired for the best kiln operation. The kiln exit gas has a temperature of 1,350 deg. F. A dust chamber settles out part of the suspended dust and a 6-ft. by 108-ft. steel stack furnishes natural draft.

The coal pulverizer has established a remarkable record for reliability as during a period of about two years of almost constant operation the only replacement has been one set of grinding balls. No disconnection of the feeder, air or fuel piping is required for such replacement as the wearing elements are accessible through a large hinged door of the pulverizer.



The three 1,000-ton capacity steel silos used for hydrated-lime storage.

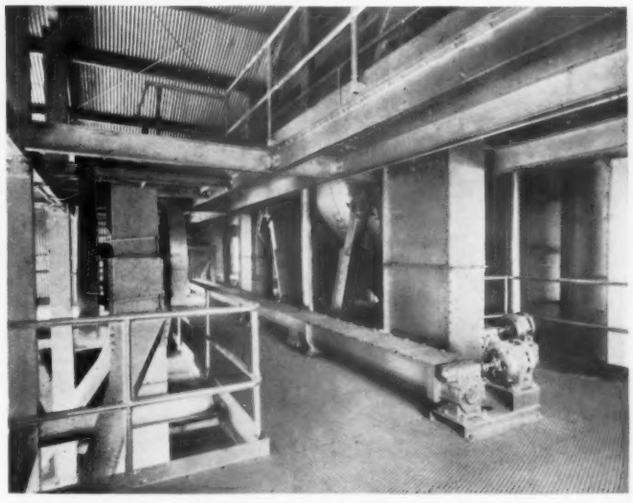
The burned dolomite from the kiln is discharged to a 6-ft. by 60-ft. rotary cooler which is driven by a 10-hp. motor of the same make through a V-belt. The cooler is unlined but has baffle plates for more efficient cooling. A short section with $\frac{3}{8}$-in. perforations at the discharge end of the cooler screens out the oversize and foreign matter. The material passing through these holes is finished dolomitic refactory and is discharged directly to a continuous pivoted-bucket conveyor with 18-in. buckets. This conveyor was designed to handle the output of a second kiln when this is installed. It traverses a rectangular path, 80 ft. horizontally and 40 vertically, elevating the material and discharging it on the side of the building opposite the kiln into two 600-ton capacity steel storage-bins. This conveyor is driven by a $7\frac{1}{2}$-hp. motor through a speed reducer. Cars are loaded from these bins through spouts and a box-car loader.

In order to produce finishing hydrate at the rotary-kiln plant only a few minor changes would be necessary. The desired size of stone would be fed from the fine-sizing plant to the kiln-feed elevator by one of the Poidometers. A gas producer alongside the discharge end of the kiln would be connected to it and an exhaust fan connected to the cooler would be used. The pivoted-bucket conveyor is so arranged that lime could be discharged over a double-deck vibrating screen from which the lump and fine lime would go to the two loading bins.

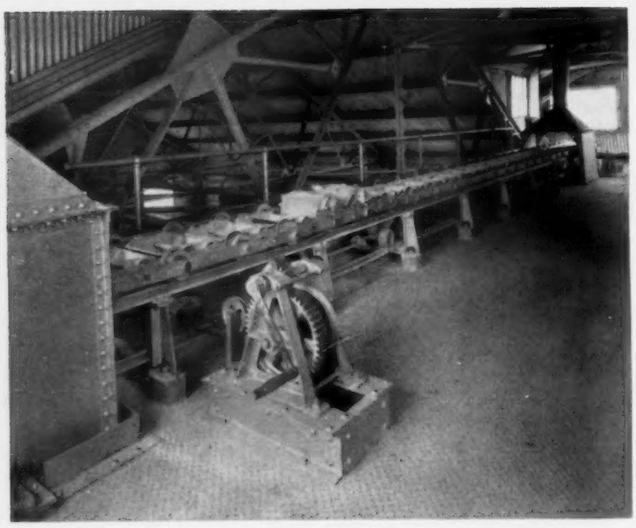
Lime Plant B, which includes the rebuilt lime-hydrating unit, consists of eleven vertical kilns, hand-fired and hand-drawn. It has a capacity of 100 tons of finishing hydrate in an 8-hr. day, which is kiln capacity for 24 hr.

After the cores are picked out a pan conveyor feeds the lump lime to a hammer-mill in the new building. A bucket-elevator feeds the ground lime to a storage-bin of 160-ton capacity.

Four screw feeders discharge the lime from this bin into the weigh hoppers of the two $1\frac{1}{2}$-ton capac-



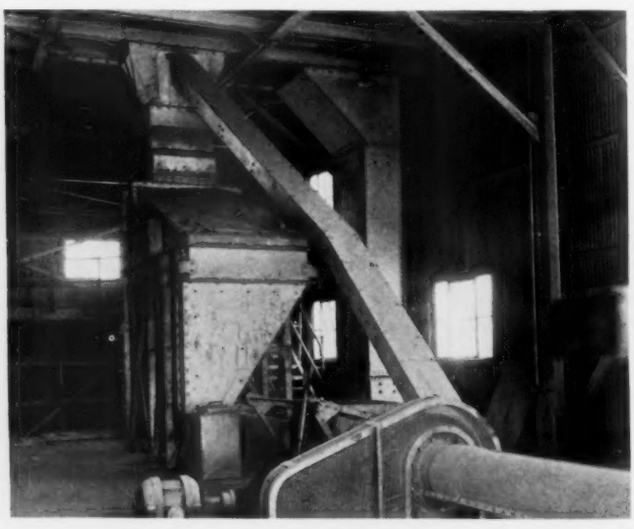
Storage-bins, bucket-elevators and screw-conveyors in hydrating plant of Kelley Island Lime & Transport Co.



Top run of pivoted-bucket carrier in rotary-kiln plant. Note buckets discharging contents.

ity batch hydrators. The hydrated lime is discharged into hoppers from which it is recovered by two screw conveyors. Two elevators in turn feed two feed bins over the two grinding mills. The finished lime is taken by two bucket-elevators to feed bins over the two 4-tube bag-packers. A storage shed at this plant has a capacity of 1,000 tons of bagged hydrate.

The hydrated lime may also be by-passed to a screw conveyor with openings permitting discharge to three steel storage-silos. These silos are 30 ft. in diameter and 80 ft. high and have a storage capacity of about 1,000 tons each. Nine 12-in. by 24-in. feeders, 3 under each silo, feed from storage to a reclaiming screw conveyor in a concrete tunnel under the silos. The screw discharges to a bucket-elevator from whose buckets the lime is discharged on a 3-ft. by 6-ft. single deck vibrating screen which is equipped with 4½-mesh wire cloth and is fully-inclosed. This removes any lumps which may have formed in storage. A screw conveyor takes the sized hydrate to the packer-feed bins.



Inclosed vibrating screen under pivoted-bucket carrier of which one vertical section is at right.

All elevators are steel-inclosed. Speed reducers are used on all elevator and conveyor drives and the belt and chain drives of all other pieces of equipment are fully inclosed. Electric motors, starters, and safety switches are used throughout.

All the above-mentioned new and rebuilt plants were designed by the engineering department of the Kelley Island Lime & Transport Co. and erected under its supervision. They are all of fireproof steel construction with corrugated-metal siding and roofing, steel stairs, floors and walkways and steel-sash doors and windows. The old plant office building burned down in March of this year and is being replaced with a modern concrete and brick structure. The plant laboratory is housed in a smaller building of similar construction.

Potash Output in the United States

Potash produced in the United States in 1934 amounted to 275,732 short tons of potassium salts equivalent to 144,342 short tons of potash (K_2O), a decrease of 17 per cent. in gross weight but an increase of 0.7 per cent. in K_2O) content compared with 1933 (333,110 tons gross weight, and 143,378 tons K_2O).

The sales of 224,875 tons of potash salts with a potash content of 114,122 tons in 1934, were 18 per cent. and 21 per cent., respectively, less than the production, and decreased 31 per cent. for potash salts, and 18 per cent. for K_2O content compared with 1933 (325,481 tons salts, 139,067 tons K_2O). The value, at the plant, of the potash salts sold was $2,813,218, a decrease of 47 per cent. from 1933 ($5,296,793). The average value per ton was $12.51 in 1934, compared with $16.27 in 1933. The value per unit (20 pounds) of K_2O was 25 cents in 1934, compared with 38 cents in 1933. About 96,000 tons of potassium salts with an available content of 50,000 tons of K_2O remained in producers' stocks on December 31, 1934. The average K_2O content of the salts sold in 1934 was 50.7 per cent., compared with 42.7 per cent. in 1933.

The chief sources of potash production in 1933 were from natural brines at Trona, California, where the potash is produced as a coproduct with borax and other sodium compounds and from potash minerals mined at Carlsbad, Eddy County, New Mexico. Potash was also recovered from distillery waste and from cement kiln dust. Small quantities of cotton boll ashes and of alunite or other potash-bearing rocks were shipped for fertilizer filler or for direct application as a fertilizing agent. The principal producers were American Potash & Chemical Corporation, 70 Pine Street, New York, N. Y., and Trona, California; United States Potash Company, Inc., 342 Madison Avenue, New York, N. Y., and Carlsbad, New Mexico; The Potash Company of America, Mercantile Trust Building, Baltimore, Maryland, and Carlsbad, New Mexico; United States Industrial Chemical Company, Inc., 60 East 40th Street, New York, N. Y., and Baltimore, Maryland; and North American Cement Corporation, 1004 Baltimore Trust Building, Baltimore, and Security, Maryland.

Sulphur Plant Uses Latest Production and Power-Generating Methods

Deposit Required Ten-Mile Canal to Bring Product to Shipping Point

By W. E. TRAUFFER

ONE of the recent important industrial developments in the South was the opening on December 8, 1933, of the new plant of the Freeport Sulphur Co. at Grande Ecaille, La. The fact that the sulphur produced in this country comes from a few large plants alone makes the addition of a new plant a rare and important occurrence which is made more notable by the fact that this plant is modern in every detail. The very latest methods and equipment are used in all departments and the natural difficulties overcome in the construction of the plant and the development of the property make an interesting story.

The location of the plant and the construction problems encountered are of interest. The sulphur deposit is above a typical Gulf Coast salt dome of which there are about 150, although only nine are being worked. The sulphur is recovered by the usual hot-water well method, the wells and main plant being located at Grande Ecaille, 45 mi. south of New Orleans, La. The property is marsh land bordering Lake Washington, but in spite of this fact the plant was erected in record time. Work was started on February 9, 1933, and production began December 8, 1933.

All the buildings, pipe-lines, conveyors, walkways, etc., at Grande Ecaille are supported on piles, of which about 18,000, varying in length from 35 to 75 ft., were used. The piles used under the main buildings are of pine, while creosote-treated cypress was used where the piles are exposed. The power-plant foundation consists of a concrete mat 3 ft. thick capping the piles, and concrete piers supported on piles carry all the major machinery units. Most of the other buildings have concrete pier and beam foundations connecting the tops of the piles. All the buildings have fabricated-steel frames with corrugated composition walls and roofs, concrete and steel floors, steel-sash doors and windows, etc. Everything is fireproof except the wooden walkways connecting the various buildings, wells and docks.

The location of the plant makes it practically inaccessible except by the canal, which was excavated from the loading plant at Port Sulphur on the Mississippi. This canal is 10 mi. long, 9 ft. deep and 100 ft. wide at the surface, and it terminates at Lake Washington at one end and 600 ft. from the Mississippi River at the other. Construction with a dipper dredge required 10 months and even here restrictions were enforced. The time and expense of excavating the canal could have been considerably decreased by the use of a hydraulic dredge, but the state would not permit this because the dredge discharge would have flooded out the muskrats which form an important industry in this marshy region. The canal was first used to transport the materials of construction to the plant site and now carries oil and miscellaneous supplies to the plant and sulphur from the plant.

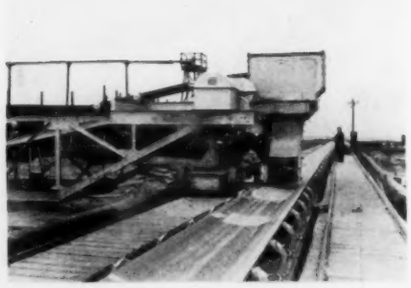
The sulphur deposit at Grande Ecaille is similar to others in Louisiana and Texas where the deposits occur in the cap rock overlying certain salt domes at depths ranging from 500 to 1,500 ft. below the

Power-plant building of Freeport Sulphur Co. at Grande Ecaille, La., with water pre-heating tanks at left.

Some of the hot-water wells from which sulphur is obtained at Grande Ecaille. Note the marshy soil.

Belt and shuttle conveyor at dock loading sulphur into barge.

Electric shovel loading sulphur from vats to one of field conveyors.



Discharge end of field conveyor to trunk conveyor to barge-loading dock.

surface. The wells from which the sulphur is obtained are drilled with rotary rigs similar to those used to drill oil wells. These wells are drilled through approximately 1,235 ft. of unconsolidated sediments and 235 ft. of limestone cap rock and sulphur-bearing limestone to anhydrite, where an 8-in. perforated line is set. A 4-in. sulphur line is then placed inside the 8-in. pipe. Hot water is introduced through the annular space between the 8-in. and 4-in. pipes and the melted sulphur is brought to the surface by means of an air-lift through the sulphur line. This process for mining sulphur is made possible because of the high specific gravity of molten sulphur which is nearly twice that of water. The waste or bleed water seeps through the formation to old worked-out wells from which it is pumped to a treatment plant. The old wells also serve to relieve the pressure in the deposit.

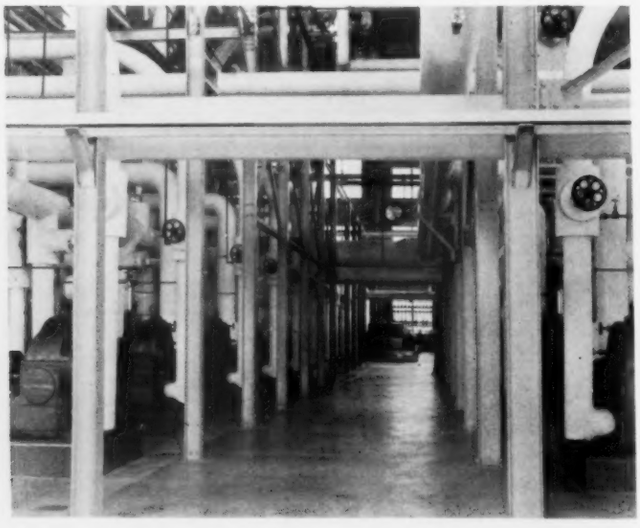
The molten sulphur is piped under its own pressure to a relay station, where two pumps rehandle it from storage basins through two insulated pipes to the cooling vats about 1,500 ft. away. These vats are merely wooden-walled inclosures into which the sulphur is poured and in which it is allowed to solidify. The sulphur is pumped into these vats about once an hour in batches of about 40 tons. As the sulphur solidifies in about 30 min. the mass is built up gradually without undue pressure on the walls. Because of the unstable subsoil conditions this mass can be built up to a height of only 16 ft. instead of to several times that height as is the custom in other locations.

When the sulphur in the vats has solidified the board walls are stripped. Holes are then drilled with electric augers and the banks shot down with dynamite. Two 3½-cu.yd. electric shovels load the sulphur into 10-ton movable hoppers mounted over field belt-conveyors. Two field conveyors and hoppers are used, one set on each side of the main conveyor. Each field conveyor has a 36-in. belt operating on 245-ft. centers and is supported on four structural-steel trusses, three of which are mounted at each end on trucks having two rollers. These sets of rollers are on 62-ft. centers and run on double rails paralleling the main conveyor. The

Conveying system at Port Sulphur which carries sulphur from barges or stock-pile to boat-loading dock in background.

truss at the discharge end of the field conveyor is supported in a similar manner at its far end, but at the discharge end is mounted on double trucks with flanged wheels to support the additional weight of the discharge hopper and spout and to keep the entire unit in alignment.

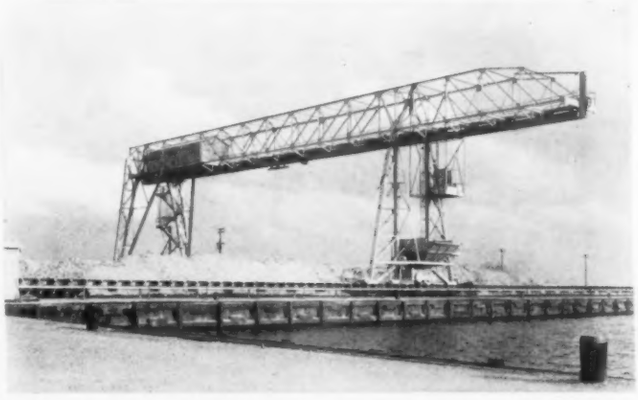
The movable field hopper is 8 ft. square and has a 12-in. mesh bar grating to remove material too large to be handled by the feeder. A belt-feeder discharges the sulphur to the field conveyor. The hopper is mounted on rails alongside the conveyor and straddles it, and is moved as desired by means of a clutch engaging with the conveyor belt. The entire field conveyor can be moved as a unit by means of a shovel. At its discharge end the conveyor belt is inclined to a height sufficient to allow



View of interior of power-house, showing some of the steam turbines and the insulated steam and hot-water pipes.

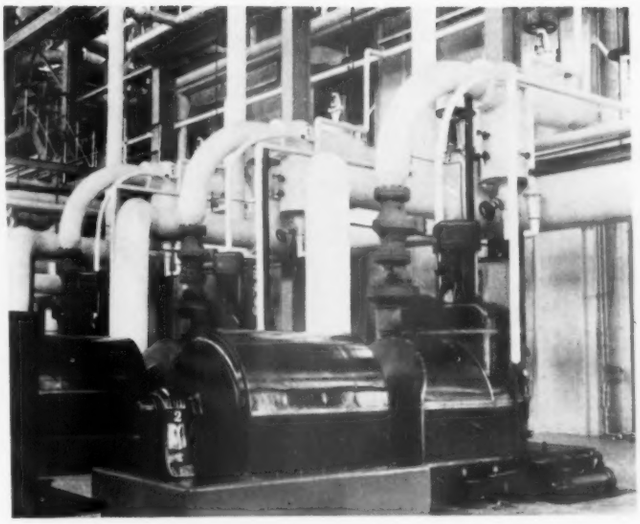
it to discharge through a hopper and chute to the main trunk conveyor. Each field conveyor is driven at its head end by a 40-hp. motor through a gear reducer. The drive is mounted on the double truck mentioned above.

The main trunk conveyor also has a 36-in. belt which operates on 980-ft. centers. This conveyor is mounted permanently on piling and is horizontal for about 850 ft. of its length. Near the discharge end it inclines to a height of about 28 ft. above ground level to the steel-frame loading dock at the canal. At the foot of this incline a Weightometer, equipped with a recorder, weighs the sulphur as it passes along the conveyor. The trunk conveyor is driven at its head pulley by a 40-hp. motor through a gear reducer. A gravity take-up keeps the belt in correct tension at all times. This conveyor discharges the sulphur on a shuttle conveyor which has a 42-in. belt on 25-ft. centers. The shuttle conveyor discharges through an aluminum telescopic chute into barges. Even distribution of the sulphur in the barges is obtained by moving the shuttle conveyor back and forth and slowly moving the barges while loading. A hoist moves the barges.



The 216-ft. span gantry bridge crane at Port Sulphur, which handles sulphur from barges or stock-pile to boat-loading conveyor.

The barges used are 30 ft. wide and 140 ft. long and have a capacity of 500 tons. When loaded, they are hauled two at a time through the canal a distance of about 10 mi. to the unloading dock at Port Sulphur. Here they are unloaded by a gantry bridge crane which has a 216-ft. span between rails. The crane has a 3-cu.yd. clam-shell bucket and spans an open storage of 15,000-ton capacity and the reclaiming conveyor. Sulphur can be handled direct from the barges to the conveyor hopper or to storage. The crane can also rehandle it from storage to the hopper.

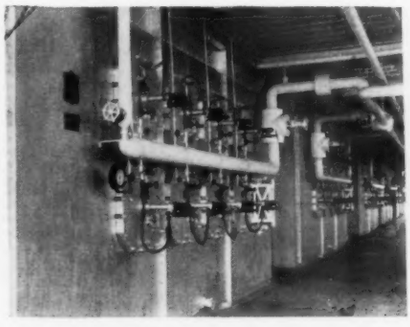


Some of the turbo-generators in the power-plant with 860-hp. oil-fired boilers in background.

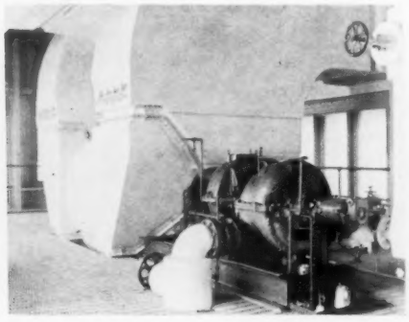
In the crane cab two motor-generator sets, using 2,300-volt, 3-phase, 60-cycle current, supply direct current to the two motors operating the boom bucket and the two travel motors. One generator set is operated by a 200-hp. motor and drives two 100-kw. generators, one operating the bucket holding-line motor and the other the closing-line motor. The second generator set is driven by a 75-hp. motor and supplies current for the crane travel motors. Three hoists control all the operations of the bucket. These are equipped with solenoid brakes.

This crane has had a remarkable record in loading sulphur from storage to the boat-loading system much of the credit for which is said to be due to the control system with which it is equipped. With this system the motor speed is increased as the load is lightened and this feature caused production to increase instead of decrease with the reduction in load.

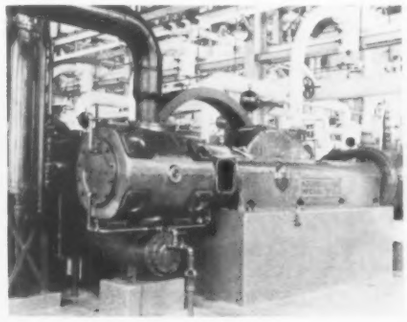
The reclaiming belt-conveyor is 36 in. wide and operates on 482-ft. centers. The first 190 ft. of this conveyor is open, allowing the loading hopper to be moved on its rails to any desired point for loading from either barges or storage. The hopper



The six 860-hp. boilers at Grande Ecaille with their oil-burners.

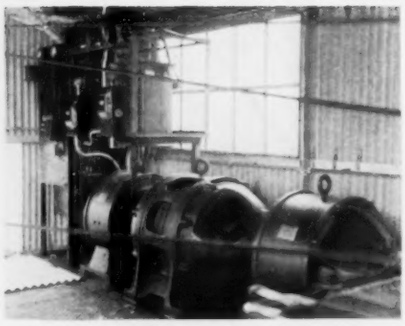


One of the insulated boiler-draft fans with speed reducer and generator drive.

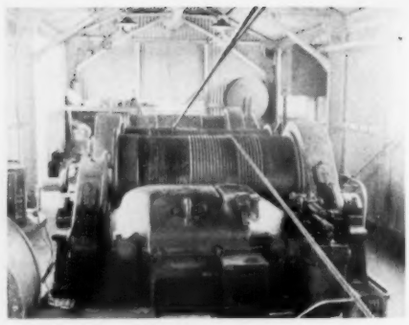


One of the three steam-driven compressors which supply air for the sulphur wells.

Device which weighs sulphur as it passes over boat-loading conveyor.



Switchboard and motor generator set in cab of gantry bridge crane.



Hoists which control bucket of the gantry bridge crane at Port Sulphur.

is similar in construction to the hoppers used at the sulphur vats and has a belt-feeder. At the entrance to the inclosure protecting the remainder of this conveyor is another weighing device and recorder to weigh the sulphur being loaded out. The last 210 ft. of this conveyor is inclined to discharge at a height of 38 ft. above ground level to a second conveyor running to the loading dock. This conveyor is driven by a 50-hp. motor through a gear reducer.

At the junction house inclosing the ends of these two conveyors a chute fitted with a gate allows the sulphur to be diverted to a hinged spout for loading into railroad cars. The second conveyor is also 36 in. wide and is on 330-ft. centers. It spans the levee, which protects the property from floods, and extends to the loading dock on the bank of the Mississippi River. This conveyor is also driven through a gear reducer. It discharges the sulphur through a chute to a boom belt-conveyor which carries it through a telescoping chute to boats or barges. The boom is so constructed that it can be raised or lowered within a loading range of 20 deg. above or below horizontal. It can also be raised to an almost vertical position out of the way of the superstructure of a boat being moved to or from the dock. The boom is operated by a hoist and a sliding counterweight balances the boom conveyor.

All these conveyors rest on structural-steel frameworks supported on concrete piers. The conveyor galleries and transfer and operating towers are inclosed with corrugated metal and have steel-sash windows. Each of the two main conveyors and the boom conveyor has gravity belt take-ups.

All the water used in the wells and plant is obtained from the Mississippi River at Port Sulphur. Two centrifugal pumps, driven by 100-hp. motors, furnish a total of 9,000,000 gal. of water daily to a 70,000,000-gal. reservoir where silt is allowed to settle out. This large storage capacity makes it possible to pump from the river when the water is clear and draw from storage at other times. Three additional pumps, each having a capacity of 1,500 gal. per min., supply water from the reservoir to the plant through a 10-mi. pipe-line. One of the three pumps is always kept in reserve and each is driven by a 250-hp. motor. The pipe-line consists of two 12-in. pipes for the first 2 mi. and a single 14-in. pipe for the remainder of the distance. The line is supported a few feet above the ground on 45-ft. piling and parallels the canal.

At Grande Ecaille the water is discharged into a 2,000,000-gal. steel storage-tank and into a 600,000-gal. storage basin under the floor of the power-plant building. From storage the water is pumped to three hot-process softening tanks, each having a capacity of 50,000 gal. per hr. These tanks also preheat the water to a temperature of 220 deg. F. through the use of exhaust steam from the turbines. The water is next pumped to high-pressure heaters, where live steam at 110-lb. pressure heats the water to 350-deg. F. Steam for all these operations is furnished by six 860-hp. boilers equipped with oil-burners. These boiler furnaces have air-cooled walls. Draft for these furnaces is supplied by three induced-draft fans having a capacity of 150,000 cu.ft. per min. each. These fans are driven by steam turbines through reducers.

The equipment in the power-house also includes three air-compressors which are steam driven, each furnishing 700 cu.ft. per min. of air at 600-lb. pressure. Most of this air is piped to the wells. Three 750-kw. generators supply the power for all the electric motors, both at Grande Ecaille and Port Sulphur. They are driven by impulse-type non-condensing steam turbines. A 7½-ton overhead electric traveling crane was used in the erection of this building and is now available for repairs, replacements, etc. All the piping, breeching, heaters, hot-process tanks and other equipment in this building are protected by high-temperature insulation.

The machine and blacksmith shop at Grande Ecaille is equipped to make any kind of maintenance repairs. The equipment includes 24-in. and 30-in. lathes, a milling machine, a shaper, a pipe-threader, a drill press, a hack-saw, a forge, bit-dressing and forging furnaces, a 1,500-lb. steam hammer a 10,000-lb. press, etc. An overhead crane serves all parts of the building. An electric shop is equipped to repair and rewind motors, and a warehouse stocks oil-well and other supplies.

The oil used for fuel is pumped from tank-boats at Port Sulphur into three 55,000-bbl. storage-tanks. It is then pumped into barges and taken by canal to the power-plant, where it is pumped into two 15,000-bbl. storage-tanks. There is also a 50,000-gal. elevated water tank which is used for fire protection.

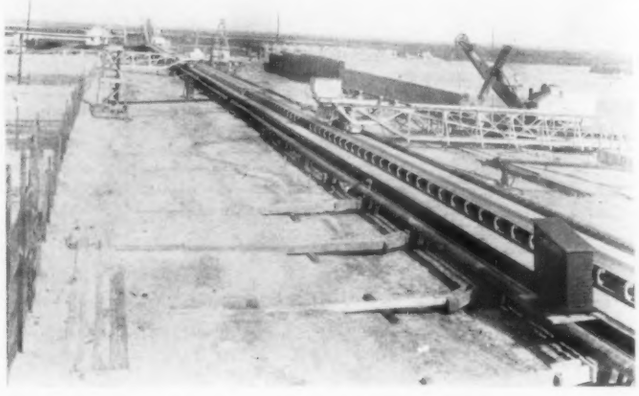
When the plant was under construction wooden bunk-houses, first-aid and cook shacks were erected for the workers. Many of the single employees now live in these bunk-houses. A town with model houses is nearly completed at Port Sulphur and eventually all the employees will live there, traveling to and from the plant by boat.

The Stephens-Adamson Mfg. Co. designed and furnished the conveying systems at both Grande Ecaille and Port Sulphur. This includes all belt-conveyors, loading hoppers, the barge-loading shuttle conveyors and the boat-loading dock.

The sulphur is weighed on Merrick Weightometers at both locations.

The Harnischfeger Corp. supplied the complete gantry bridge crane at Port Sulphur, one of the 3½-cu.yd. electric shovels and a 7½-ton overhead electric crane at the plant. The other 3½-cu.yd. electric shovel was supplied by the Bucyrus-Erie Co. The 3-cu.yd. bucket operated by the bridge crane was supplied by the Blaw-Knox Co.

The Babcock & Wilcox Co. supplied the six



Sulphur vats at Grande Ecaille with shovels, field conveyors and the main trunk conveyor feeding to barge-loading dock in background.

850-hp. boilers complete with oil burners and high-pressure heaters.

The Ingersoll-Rand Co. supplied three Imperial Type 10 air-compressors and the American Blower Co. all the fans.

Many of the electric motors and much of electrical equipment are Westinghouse and the General Electric Co. supplied the steam turbines, the three 750-kw. generators and some of the electric motors.

Allis-Chalmers water pumps and Falk speed reducers are used.

The Freeport Sulphur Co. also operates two plants at Freeport, Texas. The main office is at 122 E. 42nd St., New York, N. Y. The company's officers are: J. H. Whitney, chairman of the board; L. M. Williams, Jr., president; Monro B. Lanier, vice-president; W. T. Lundy, vice-president and general manager; Pearson E. Neaman, secretary; R. K. Shirley, treasurer.

Increase in Gypsum Output

The production, imports, and sales of gypsum and gypsum products, except for uncalcined or raw gypsum sales, were greater in the first quarter of 1935 than in the corresponding quarter of 1934 according to returns of the quarterly canvass of the gypsum industry by the U. S. Bureau of Mines.

The output of crude gypsum and gypsite in the first quarter of 1935 totaled 292,406 short tons, compared with 266,761 tons in the first quarter of 1934, an increase of 9.6 per cent. Imports as reported by importing firms, although seasonally small, also increased. Sales of raw or uncalcined gypsum or gypsite of domestic and foreign origin were 1.0 per cent. less than in the 1934 period—84,853 tons, compared with 85,747 tons. The amount of calcined gypsum produced from domestic and imported rock, slightly less than in the last quarter of 1934, showed an increase of 13.3 per cent. over the first quarter of 1934—206,476 tons in the first three months of 1934, compared with 233,852 tons in the corresponding period in 1935.

Sales of calcined gypsum for pottery, terra cotta, plate glass or other manufacturing uses were over one-fifth greater in the first quarter of 1935 than in the same period of 1934. Plaster sales increased 11.1 per cent. Sales of wall-board jumped 19.3 per cent. in the current quarter over the same quarter in 1934, the figures being 51,362,098 sq.ft. in the 1935 period compared with 43,058,081 sq.ft. in 1934.

Winners of Safety Competiton

Announcement of the winners of the National Safety Competition of 1934, in which recognition was given to outstanding safety records attained during the calendar year 1934 by numerous mines and quarries, has been made by John W. Finch, Director, United States Bureau of Mines, Department of the Interior, which sponsored the contest. Three hundred and thirty-four mines and quarries in 38 states participated in the competition and notable accomplishments were achieved in the operation of mines and quarries without accidents or with quite low accident rates in 1934. The competing companies were divided into five classes: Anthracite mining companies, bituminous-coal mining companies, metal-mining companies, operators of nonmetallic-mineral mines other than coal mines, and quarries or open-cut mines. A replica of the bronze trophy, "Sentinels of Safety," donated by the *Explosives Engineer* magazine, was awarded to the winning company in each group.

In the nonmetallic-mineral group, first place was given to the LaSalle mine of the Marquette Cement Mfg. Co., Oglesby, Ill., which was operated through 105,376 man-hr. without a lost-time accident.

In the group composed of quarries and open-cut mines, the winner was the Rogers City limestone quarry, Rogers City, Mich., operated by the Michigan Limestone & Chemical Co., which worked 727,503 man-hr. in 1934 with no lost-time accidents. This quarry was given the highest award in this group in 1929, 1932 and 1933.

Should the N.I.R.A. Program Be Extended?

The Concluding Portion of a Symposium on the Value of the Principles of N.R.A.

IN our judgment the N.I.R.A. has not improved labor conditions nor marketing conditions in our industry, nor business generally.

No thinking man is opposed to a reasonable minimum hours and wage scale and, going one step farther, a five-day week if universally applied would, no doubt, result in removing many of the unemployed from relief rolls.

Throughout history there has been no substitute for the law of supply and demand and the survival of the fittest. In many instances the N.I.R.A. has been a detriment rather than a benefit in that the level of prices has been pushed up to such an extent that it has destroyed the market for many commodities, particularly in the building world.

We do not favor the N.I.R.A. itself, nor the general principles prescribed in the act. It is un-American and not workable. [*Sand and gravel*]

* * *

IT is my opinion that the codes have been a help to our company.

So far as labor is concerned, our relations are most pleasant for the reason that our men are not unionized. Our production costs have increased slightly, but we have been able to more than offset this in the price received for our material. It has also brought about a very pleasant relation between our company and our competitors.

We have received no benefit from the checking of new-plant construction for the reason that the report of our state committee has never been approved in Washington. My only disappointment in the code is in that connection. I happen to be chairman of . . . [our] state committee, and we prepared a very elaborate survey of the production facilities of sand and gravel in our state, and found that the shipments for the past several years of material of this class have only been a very small percentage of the production capacity of the plants now in operation.

My company is very much in favor of seeing our sand-and-gravel code continued, including the clause regulating the expansion of plants and [hope] that all state reports showing conditions such as now exist in the state . . . be approved promptly.

I am not advised as to whether the increase of purchasing power has been brought about by the N.I.R.A., but it is a fact, nevertheless, that our sales have increased substantially within the last six or eight months.

I am of the opinion that the N.R.A. has reduced unemployment among those who really wanted to work, and has helped to restore national confidence; although I am of the opinion that the relief measures have more than offset the N.R.A. in getting people back to work.

We have had a very few violations of the fair-practice provisions of our code. This state is exceptionally well organized, and the members of our industry are working in harmony. [*Sand and gravel*]

* * *

GENERALLY speaking, I should say code control has helped our industry, especially from a competitive point of view. Labor is much higher now, up practically 50 per cent. to more than 100 per cent. in our industry, and while in our own case our relationship with our workers still remains composed, nevertheless, many of our competitors have not fared so well. The 30-hr. law would be almost suicidal.

Perhaps our industry stands out more than others, as it has been rather code conscious and guilty of few violations. So far as enforcement under law is concerned, perhaps this is another question and I would hestitate to comment without the benefit of counsel. But, generally speaking, codes are not bad for basic industries, perhaps smaller business needs none, yet any code, to perform reasonably satisfactorily must embody regulatory measures,

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THIS group of letters completes the collection of which the first portion appeared in the May issue. Their interest to nonmetallic-mineral producers has not been materially lessened by the Supreme Court's decision invalidating the N.R.A. program because some substitute legislation, carrying on the main principles of the National Industrial Recovery Act, will probably be enacted by Congress. The present letters, considered together with the previous ones, give what may be regarded as a fairly representative symposium of producers' opinions on the questions of economic and social policy involved in any proposal to extend the work and influence of the N.R.A.

—EDITOR.

▲ ▲

subject to enforcement, in the matter of sales tactics as well as in an ability to hold the manufacturer liable for strict observance of wages to and hours of labor. What is needed most is merely fair dealings between capital and labor, with the merchandising side to take care of itself, which, after all, is well influenced by supply and demand. Our code has been amended and what added good it is going to bring about, if any, I am not prepared to say until after its mechanism has actually been put in operation. [*Lime*]

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THE general point of view from which I approach the question is indicated (incompletely) in the first paragraphs following:

1. I do not believe in governmental control of industry being extended into the field of business management, or appropriating to the Government the control of initiative in industrial enterprises and their operation. I do not believe in the wisdom or necessity of "industrial regimentation" in the U.S.A.

I believe that the Governmental function should be to set up principles of equity and justice by statute, and to see to it that the practices of the citizens keep within the limitations thus established.

From time to time (as has been true in the past) new applications in details of these principles are recognized as desirable and possible. These new specific limitations can then be stated in law and enforced in the equal interest of all the citizens. Progression of this kind should be gradual, a step at a time, giving the people time to educate themselves to the new practices without such confusion and disruption of the social interference with national advance in prosperity—measured over long periods. Human beings are not qualified to adjust themselves overnight to a brand new and entirely different social existence with new basic principles and new incentives.

2. I believe the regulation of hours of labor, wages and working conditions could be handled to better advantage under a separate law, or at any rate not left in any part to the administrative attention of the Code Authorities. There are commissions or divisions of the Governmental organization already established which could take on these duties, if a little extension of the field of authority were provided by law. Under the present N.I.R.A. and the N.R.A. policies no real authority in these matters is left to the Code Authorities in most cases.

The law to control this should not closely resemble the Wagner bill. The law should be as careful to guarantee against coercion by the national union organizations (or any trade-union organizations) as it is to guard against the possibility of coercion by employers on employees. In my opinion, the nearer the situation can be left to the employers in a given plant (or set of plants operated by the same company) and the employees thereof, the better the chance for actually fair adjustment of these labor relations. At any rate, there should be no such compulsion on the employees as can be exercised by the officials of a national trade-union organization (some with great income at command), which on the occasion of a difference or dispute centers all its power on one company to force that company into line and also to force the employees to the union point of view. If the unions are to exercise all the power that the officers of the trade unions evidently intend that the Act shall give them, there should be corresponding responsibility imposed on these unions and their officers. Also 51 per cent. of the employees (or majority) should not have the right to decide for the 49 per cent. and dictate to the minority. Probably compulsory arbitration will be unavoidable in the final decision.

3. As a general criticism of N.I.R.A. code functioning, the administration of the act by an individual administrator, or a board of administrators, operating through (or with) five and more advisory boards and other governmental bodies entitled to be consulted, would continue to make it difficult to establish a fixed and understandable basis of decision and action for the Code Authorities and the members of the industries, except, perhaps, after the provisions have been interpreted and anchored down in the course of years of experience. The enforcement of the provisions of the numerous codes has been difficult and unsuccessful due to the fact that each of so many thousands of individual questions has had to be decided by interpretations which are really legislative and these interpretations before promulgation have to be agreed to among the several advisory bodies. The result has been uncertainty and inconsistency, leaving much occasion for interpretation of interpretations so that the final decision is delayed so long as to make enforcement impossible or futile. The main source of the trouble may be that the act fails to complete the

statement of the principles intended to be applied. Ten or twenty or one hundred executive and advisory members of the administration, endeavoring to remedy the deficiencies, can often only agree on hazy, inconclusive compromise "interpretations" and "executive orders."

Absence of prompt and definite decisions and failure of enforcement will cause such loss of faith and annoyance, especially to business executives, as sooner or later to destroy the codes. The question is whether, under an act of the detailed regulative character of N.I.R.A., there can be the wise and clean-cut, prompt decisions that are necessary. It remains to be proved.

4. As to the code in which we are most directly interested—and the same comments apply to a great number of other codes—the support from employers (industrialists) came from the belief that there would be substantial relief from the restrictions of the anti-trust laws, permitting as a most important feature the regulation of prices and/or production so as to remedy price-cutting and destructive competition. Almost all the prohibited practices really are considered "unfair," because they unfavorably affect the price level.

In our code the limitation-of-production feature amounted to little and no doubt is now on the way out. So apparently is the price "floor," or minimum permissible price provision, which minimum represented actually little more than one-half the cost. It is also authoritatively announced that the policy of the N.R.A. will no longer permit a "time lag" between the date when a price must be filed and the date when this filed price is effective and can be quoted or accepted in a sale. What value, then, is left in the "open price"? The vast majority of the producers will probably conclude off-hand and quickly that there is practically none, and no justification for the expense of maintaining a Code Authority and regional and district committees, etc.

When the new act is passed, and the new limits known, it would seem only fair, and indeed compulsory, to provide for a referendum to determine in each district whether the producers wish to continue the practice of the open price and pay the cost of administering it. If voted out and all labor disputes, etc., are handled otherwise, the Code Authority organizations could be greatly reduced, with a corresponding saving out of the great cost. . . .

5. The codes, under any extension of the Recovery Act that does not greatly alter the nature and scope of the provisions, can, I believe, be so valuable to industry as to justify their continuance. Even an open-price system based on *post facto* publication of prices can be worth while and maybe is really the best first stage, providing the opportunity for practice and for building the foundation for further control in the general interest. It may, however, require much promotion to put the idea across with the members of the industries and maintain their interest strongly enough and long enough to establish the coöperative habit and spirit that would be its most valuable result, and that would provide the basis for the future establishment of "fair practice" in competitive trade.

6. Subject to qualifications, the nature of which are more or less suggested in the foregoing, I favor extension of the N.I.R.A. and the codes. Its effect on our individual (slag) business, I believe, has been favorable to some extent as to price, but the general effect on our business has not been great. There have been many annoyances in being tied to the red tape of open-price rules, and an increase of cost in operation, the latter also accompanied by some annoying restriction on management. Over the country, according to report, the results seem to have ranged from failure (almost) or no result, to quite favorable improvement, noticed particularly in price.

It should be noted that the act and the regulations under it can hardly be said to have been fully in use and effect. Much time will be needed to turn the administration—and the more or less legislative interpretations and orders on which to base administration—into workable form, definite form, leaving little opportunity for argument. Impatience tends to destroy compliance and prevent "effectuation" of the purposes. Since the act has required paying out more wages in total, there must be about the same increase in the amount of money being spent. The employer, however, has about the same amount less in his bank. The extra wages paid got him nothing but moral satisfaction. I think it has reduced unemployment a little, in the sense that where formerly one man (such as a watchman) handled a job week-in and week-out, two men are now employed in order not to exceed the maximum hours permitted. Each one receives, however, less than the wages formerly paid out, but the total paid two is more than was paid one. Occasionally extra wages for overtime increased cost to meet temporary demand. The average working time of all employees in the industry has been less than 40 hr.—everybody on short time because of lack of orders—so the effect of the time limitation (and the objections to it, if any) are yet to be developed in experience. The reduction in unemployment from the effect of the N.R.A. has been rather small in our industry. In some districts—I imagine most of them—there has been perceptible restraint on wasteful competition as a result of the open-price practice. If the "time lag" feature is now eliminated, this restraint will be pretty completely gone unless the habit has been formed and the desire to meet, discuss and coöperate persists strongly. I can not see that the N.R.A. at this date can claim credit—or, perhaps I mean, more accurately, is given credit—for restoring confidence. A real job is ahead right now to restore and build up confidence in N.R.A. and the code, if the system is to succeed and continue to exist.

There are many reports (or claims) of violations of the code of our industry and there is much to be done to make clear what is or is not a violation. If and when the code regulations are made clear and definite, and the enforcing system is made simple and single and prompt, I believe the experience shows that there would be fairly universal compliance. However, there are a lot of "ifs" in this. To accomplish the *successful* result means persistent, burdensome attention by the members of the committees continuing from now on. There is great danger of weariness overtaking the well-doers. The system in its administration as now conceived and set up brings government too much into details of business management. I hope the deficiencies can be remedied.

The foregoing is doubtless based too exclusively on experience with one code and the expression therefore of too narrow an outlook. The one code is a relatively small part of the N.R.A., and different in its application and effects from others. [*Slag*]

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THE N.R.A. in my opinion has helped to create a more friendly relation between competitors, has helped to maintain prices, and has increased employment slightly during our shipping season. However, on the other hand, the N.R.A. has decreased the earnings of our employees, who can only work 40 hr. per week during the shipping season, when they could work more hours and thereby even up on the hours they lose during the winter months when our industries can not operate. It has had a tendency to create unfriendly relations with our employees as they are being urged to join some kind of union to fight our industries "for their rights," being advised that that is what the N.R.A. expects of them. It has increased production costs and thereby increased our losses, as our prices have not increased.

In short, it is my candid opinion that our industry would be a great deal better off if this law were repealed and forgotten, because the open violations which are not being prosecuted, as the N.R.A. seems to have no power to enforce the provisions of the law, are causing this law to be ridiculed and ignored. Unless it is repealed or enforced, which I am reasonably sure can not be done, it will demoralize our industry until there is no coöperation between competitors, or between employees and employers, and it will be necessary to have arbitrators in every locality to keep conditions nearly on an even basis. The sooner this N.R.A. is forgotten the better. [*Sand and gravel*]

* * *

N.I.R.A. was intended to mean National Industrial Recovery Act. The three words, national, industrial and recovery are quite clear. This was intended to mean the recovery of industry everywhere in this country. In effect this legislation has come to mean the National Industrial Reform Act. There is in my opinion a vast difference between recovery and reform. Reform does not always mean recovery. It is probable that reform results in most instances in a lack of recovery. It therefore appears that this legislation has got on the wrong track. . . .

I am personally in favor of seeing the N.I.R.A. discontinued when it expires in June.

N.I.R.A. has not been beneficial to our company's interest. We have on the other hand accomplished certain constructive things in our business as a direct result of education, through the efforts of our trade association, which leads to the statement that trade-association activities should be encouraged and should be permitted to take the place of what was originally intended under N.I.R.A.

So far as the feldspar industry is concerned, N.I.R.A. has permitted an increase in pay to the mill and mine workers, it has increased production costs and has not improved competitive relationship. Neither has it increased profits. . . .

I subscribe to the idea quite strongly that the employees in industry should be paid more than a subsistence wage, and if it requires some form of legislation to carry through this principle, then I believe this legislation should be enacted.

When a concern willfully goes out to cut prices for the purpose of gaining greater volume and in order to exist it reduces the workers' wages, then this principle is fundamentally wrong. If on the other hand, some concern is foolish enough to cut prices but still pays satisfactory wages to its workers, then this condition is purely a matter of policy for the particular concern and we all know that such a policy will last only a relatively short time.

Many manufacturers subscribed to the principles outlined in the national recovery act because they believed that the act was the means to profitable operation. In other words, many manufacturers believed that the act would insure them success. They looked upon it as an easy way out and an easy way to profits. Now they believe they have been disillusioned. They were not fooled except to the extent that they fooled themselves. No legislation, however conscientiously conceived and sincerely executed, will ever guarantee an inefficient operation to succeed.

The only modification I would like to see enacted, and I doubt seriously whether it would be practical, is to establish minimum rates of pay, maximum hours of work and eliminate child labor. In doing this it should be made clear that the A. F. of L. is not the one to dictate labor policies. Obviously we have political minds to deal with, and these minds would like to throw the whole thing into the hands of the A. F. of L.

N.R.A. as presently constituted is a contradictory piece of legislation. The government asks that industry provide minimum rates of pay, maximum hours

of labor and dispense with child labor, all of which are very good, and immediately turns around and says greater quantities of foreign manufactured products should be permitted to enter this country. This is only one illustration of the many contradictory features of N.R.A.

N.R.A. in my opinion is a negative approach to a problem that can not be solved by legislation. N.R.A. is just one part of the so-called "new deal," which to a considerable extent places a premium on inefficiency, indolence, idleness and negative features of this general character. For instance, we hear a great deal about unemployment, but we do not hear anything about the great masses that are employed. We talk about unemployment insurance, whereas we should be advocating employment insurance. The negative approach of course is a political approach and is done largely to secure votes rather than to improve conditions. If our approach could be changed to a positive approach and we could forget all about reform, we would in my opinion progress rather rapidly.

Human nature is so constructed that it rebels against reform but always welcomes improvement of a constructive nature. In my opinion, politicians and politically-minded people are more useful than reformers. Therefore, since N.I.R.A. has come to mean national industrial reform it seems to me that industry would be greatly benefited if the act were discontinued when it expires. [*Feldspar*]

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THE lime and crushed-stone codes are both very weak from the standpoint of protecting the investors. The N.R.A. has not established cost and without the establishment of cost no one apparently can be criticized for selling at a loss or below his actual cost of manufacture and distribution. Furthermore, it is our understanding that the N.R.A. has decided to only allow certain items of cost, such as out-of-pocket operating expense and administration, excluding cost of distribution.

From the standpoint of marketing the codes have not been very helpful.

From the standpoint of spreading employment by reducing hours of labor and from the standpoint of cost by increasing wages, a definite burden has been imposed upon industry, as short hours increase the inefficiency and cost of production as well as the wages paid.

While costs have been soaring, selling prices have been sagging. Just when the two will cross the line is rather difficult to forecast.

If the government is serious in its efforts when making laws applicable to the well-being of all, then all parties should be considered and protected under the N.R.A.—workers and investors as well as the consumers of the products.

The writer is at a loss to see to what extent, if any, the investors in business have got any consideration or protection, which probably in part accounts for the low selling prices of stocks. [*Crushed stone*]

* * *

LAST year our code was new and our industry, as a rule, tried to live up to its requirements and was fairly successful. The result was we had a far greater stabilization of prices, and I think all concerned were better off for the code.

This year there seems to prevail in the minds of many a feeling that the code was not going to be enforced, and we have found many people in our industry who were "chiseling" and not living up to the terms of the code. The trouble right here is the inability of the Code Compliance Division to act promptly on the code violations.

Our industry is not unionized, but in our Southern plants we use a great quantity of colored labor. The code has increased the cost of this labor two and one-half times, and this has added considerably to our production costs. We hear from rather dependable sources that many employers of labor are not living up to the terms of the code. Our company has, however, adhered strictly to it.

The fair-practice provisions of our code have been helpful to our industry in assisting in doing away with many unfair trade practices that formerly had been used in our business.

Our code requires us to operate under an open schedule of prices and terms. These have to be filed with a central office with a ten days' notice before they become effective. Any competitor, however, can meet them by giving only a 48-hr. notice, and any producer in our industry is at liberty to file a new schedule carrying any terms, prices, and conditions that he sees fit so long as he does not sell below cost. This has had a tendency to stabilize prices and has been helpful as a general rule.

I favor an extension of the N.R.A. as to trade practices, open scheduling, and even collective bargaining, provided company unions and national unions do not in any way encroach upon the rights of the individual workers or minorities, and I feel that unions should be held to strict accountability for their actions the same as industry is held. This Administration has catered too much to labor unions. [*Phosphate rock*]

* * *

IN the southern part of the state . . . there have been no labor difficulties, although several operators in northern . . . did have a period of considerable labor unrest, apparently due to professional organizers attempting to secure domination of labor in our industry. This condition was finally brought under control and to the best of our knowledge the labor situation is quiet. . . .

Due to the absence of a sufficient volume of business necessary to constant operation of producing plants in our industry, labor has profited nothing of material importance since the establishment of the code. Labor rates were increased to at least the minimum required by the code, but the reduced hours of employment have so reduced weekly or monthly income that labor has received no benefits of consequence.

Production costs have been increased to a rather alarming degree affected by increased labor and supplies, decreased production causing a narrow distribution of overhead and a marked increase in taxes. The operator has not been able to increase the prices of the products of our industry to the extent necessary to compensate for increased production costs. There has, however, been a gratifying stabilization of prices. The prices in the higher brackets have not increased but much of the cut-throat, fighting price battles have been quieted, with the result that the prices in the lower brackets are not as low as they formerly were. The average price over the period has been increased to some extent.

Profit making in our industry is rare, yet some producers report that meager profits have been earned.

Some operators report an improved situation with reference to the margin between sales price and production costs, mostly a reduction in producing costs, which has been in many cases accomplished by the discontinuance of the employees' protective insurance, the discontinuance of employing men on a monthly or weekly basis and substituting therefor an hourly basis, the adoption of a hard-boiled policy of cutting off labor arbitrarily and at any hour of the day when production is discontinued or delayed from any cause whatsoever.

Previous to the codes most operators maintained a liberal attitude toward their labor and would pay their men for much time when actual production was not in effect, no notice was given to operation delays caused by minor repairs or breakdowns, stagnation in the removal of finished products from tipple to storage, short periods of rainfall, etc. However, this leniency and consideration for labor has almost disappeared.

The competitive relationship between operators has been affected both ways, advantageously and disadvantageously. The fair-minded operators, for whom no code was ever necessary, are probably more friendly at this time and understand and appreciate one another better than ever before; however, there is a marked increase in the hatred and the lack of tolerance and consideration for the cheating, lying, "chiseling" operator. They still are in existence in spite of code regulations, bureaus, bureaucrats, "brain trusts," etc.

About the only difference in the relationship between the fair-minded producer and the "chiseling producer" of this date, as compared to pre-code date, is that the fair-minded producer is more vulnerable to the attack of the "chiseler." The fair-minded producer stands in the wide-open spaces, the easy target for the cheating and "chiseling" sharp-shooter. The exacting requirements of definite and indisputable evidence by the Administration renders it almost impossible to catch and penalize the "chiseler." About all that has happened is that the "chiseler" has sharpened his wits, speeded his methods and is more effective than heretofore.

The open-price policy has not functioned as was expected and it is very doubtful to the writer whether or not it ever will be made to function in a manner that is sound, profitable and fair to the producer, the consumer and the laborer. We believe the open-price policy is impractical, unworkable, conducive to monopoly and destructive of the moral character of the industry. It is impractical because of the many variable conditions existing even within the confines of a territory so small as a marketing district. The needs and demands and, therefore, market conditions of a state highway construction bureau are greatly different from those of a county commissioner, township trustee, city or village official and private individual. In some cases the amount of a contract involves great tonnage and large sums of money and in others just the reverse. Specifications of this various group of consumers are so varied that it is impractical to attempt an open-price policy to cover them. The transportation service which becomes a part of the cost to the user of our products is so variable that it is not only impractical but impossible to establish a standard and uniform policy.

The open-price policy is unworkable because, as stated heretofore, the fair-minded operator is made more vulnerable to the lying, cheating, "chiseling" methods of the uncharactered chiseler. Human nature is human nature and there is nothing in the codes that has the slightest effect on changing this personal attribute. You can not make all men honest and fair-minded by passing laws. The legal requirements of code authorities and administrative officials as well as public officials are such that it is extremely difficult, if not altogether impossible, to exercise the penalty provisions of the national recovery act in preventing violations of the code.

The open-price policy tends toward a condition of monopoly. If all the provisions of an open-price policy were effective and the prices, terms and conditions of sale of all operators on a given project were identical it is quite obvious that the purchaser would award his business to the large producer with ample equipment and production facilities to insure constant and undisturbed flow of material. This would work a hardship on the small struggling producer who heretofore has been able to maintain his existence by offering a slightly lower price.

It is the firm opinion of the writer that much can be accomplished that will result in benefit to the industry, to the laborer of the industry and to the consumer of industry products, if the codes were dissolved and a few simple requirements substituted:

(1) The establishment of minimum la-

bor rates and maximum labor hours to be administered, inspected and enforced by an independent agency not in any way connected with either the employee or the employer and armed with sufficient legal authority to make them effective. This would properly be done by an independent agency established by either Federal or state authorities, making periodic inspections and filing reports with the legislative body whose duty would require that they secure thorough and complete compliance.

(2) Provisions similar to House Bill 102 recently passed by the Ohio legislature should be made effective. . . . This would prevent public funds being spent with an operator who fails to pay his taxes, to protect his men with industrial insurance and to meet his pay-rolls promptly.

(3) The establishment of state bureaus of standards, having the authority to establish, inspect and enforce a standard specification applicable to all projects where public funds are used in whole or in part.

With these relatively simple specifications we would establish a uniform target, provide uniform ammunition and from that point on we might well let each marksman use his own skill.

There is one further point about which the writer has not arrived at a definite conclusion, but it does seem reasonable that some program might be inaugurated to prevent or regulate the unnecessary, unproductive investment for additional capital in producing plants where there is no economic reason for their existence. Untold millions of dollars of American capital have been unsoundly invested in production of various commodities when there was no reason for such development. Much of this waste has been caused by the unethical exploiter who painted a promising picture to the uninformed investor, the net result being that great injury was done to existing production facilities and great losses incurred by the investing public. We believe that some form of regulation might be reasonably worked out that would require anyone proposing to construct new production facilities should be required to show reasonable economic need therefor before being permitted to proceed. [*Crushed stone.*]

* * *

WE would be very much in favor of N.R.A. and our code, if the N.R.A. administration had courage enough to act on non-compliance cases. However, for the past year they have completely fallen down on enforcement of our code, and without proper enforcement we are opposed to their act in any form.

We believe the act promised to be a milestone in economic history but has been a complete failure, due to lack of a cooperative attitude on the part of the Bureau of Public Roads and a complete failure on the part of the Compliance Division of the N.R.A. . . [*Crushed stone*]

* * *

N.I.R.A. appears to have had some benefits and some disadvantages to our company. Labor relations have not been measurably disturbed except at one or two plants where the unions have become emboldened by the encouragement from Washington, both under the laws and in administrative policies.

Employment has not been measurably increased, but production costs have increased very substantially as to the labor item and, to a lesser extent, in materials. Prices are the only bright spot in the picture for us in that they have been improved to some extent, probably a little more than the increased labor and material costs. However, it must be borne in mind that prices in 1932 were about as low as they had been for many years in most of our lines, so that the slight bulge resulting from the codes has not yet brought us any real results. It is true that on approximately the same volume of business we have made some better gross profits in the latter part of 1933 and through 1934, as compared with 1931 and 1932. In the building-material industry prices were at their best levels around the middle of 1928, and from that point on they have turned downward, and even the present prices under the codes are still far from the prices in effect in the period from and including 1926 to the early part of 1928.

Competitive relationships have doubtless been improved. At least we can now sit down and discuss some matters without going to jail under conspiracy laws. However, we have a large amount of "chiseling" by the so-called smaller fry, but they have eaten into the volume of those like ourselves, who are respecting the codes religiously, and it is utterly impossible to get any active policing or imposition of penalties for violations that are constantly going on. A code without teeth will never bring on that happy day that is the objective of the idealist. We doubt whether it is possible for everybody in any industry, where there is a large number of operators, to stand hitched, and we find that these new laws have brought forth a very large amount of open-faced lying that is not conducive to a harmonious operation of the industries as a whole in which we are engaged.

We have found that the codes have not particularly checked new-plant construction, since in some divisions of our business there have been some new plants built, and some new people have acquired old plants and have gone into the business and are sitting under the umbrella of the code.

We would favor a further trial of the N.R.A., but some of us would prefer to see teeth put into the code so that violators would be made to suffer real penalties. We have been told that in Washington there is a tendency to scrap the open-price filing system and to emphasize the wage and hour provisions, and if this is going to be the situation we would rather see the code scrapped *in toto*.

We do not think that N.I.R.A. has itself increased general purchasing power to any extent, but such improvement in unit volume as there is, which is small, may possibly be attributed to Government spending, which is illusive and temporary. The unit volume of our business was not much more in 1933 or 1934 than in 1932, and, in fact, 1930 and 1931 were both considerably ahead in units shipped, but, of course, prices were lower than under N.R.A. [*Gypsum*]

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THE construction industry and related groups owe much of their existence the past two years to the N.I.R.A. Our own industry has practically lived off Federal appropriations during this time, due to stagnation of private and commercial business. Had it not been for Federal funds no producer in this territory could have weathered the storm.

Labor provisions of our code have not affected us in any particular degree. That is to say, there has been no hardship suffered. Our company has always paid considerably more for labor than our code specifies and we have never had any trouble with labor problems. . . . It has been necessary for us to decrease our forces the past three years due to a very marked reduction in production. Our production costs have increased during this period approximately 10 per cent. on account of added expense of code fees, higher wages to some employees and unsatisfactory operation of plants, there being no continuity of operation. Prices on the products we produce have held up fairly well, but we have not been able to effect any increase, in fact as a whole, prices have been "chiseled" downward. Profits have almost vanished as compared to former years. Competition now is keener than ever, due to a marked increase of governmental agencies in business and a mad scramble for the little business offered by all producers. New-plant construction has been checked almost entirely, as we are operating only about 30 per cent. of capacity.

Under the present stress of conditions we would favor extension of the N.I.R.A., but would like to see many changes effected. We would recommend that all government agencies get out of our field of business, and many other businesses. It is absolutely impossible to compete with the government, the reserve of public funds is too large for private enterprise to buck up against. Loss or profit is of little concern to the government; it has a way to take up the slack in either direction. We would suggest that all public work be done by contract, and that all work be of a constructive nature, rather than the give-away system of many of the F.E.R.A. projects and the like. If the government is going to spend money, let the public reap some constructive benefits. If we are to continue with codes of fair competition, they should be modified and changed to meet conditions which in the past two years presented themselves. To be effective codes must have more definite and progressive administration and enforcement. Today there seems to be utter disregard to code rules and regulation, due chiefly, we believe, to such weak enforcement agencies. We have found in our own territory that the government is one of the largest violators. True, government agencies are not governed by any code, but these same agencies have fostered code violations by awarding work to non-compliers.

Some changes we would suggest in code modification are, referring to the sand-and-gravel industry, the elimination of all regional offices. We find in our own locality that the regional office is of no consequence, but only an added expense to producers for which no good is returned. We have too many divisional offices, committees, etc., and code expense is far too high and the producer is suffering accordingly. We believe each state should operate and control its own organization responsible direct to the Code Authority in Washington, and that no other divisions of the Code Authority are necessary. It is very unsatisfactory to group states together under a regional set-up, where these states all have their own peculiar problems. No harmony of action can come from a region where all the individual states are bulldogging their way through, so to speak. Again, as stated above, we must have more rigid and effective enforcement. The code must also more clearly define and set forth who belongs under its jurisdiction, so that problems, such as the contractor-producer, will not continually blur code administration. In all, we must have more self-government of our own problems with our own local organization.

The enactment of N.I.R.A., we believe, has increased the general purchasing power, but in no way has assisted in actual recovery of our business. Rather, it has provided means for our business to survive. Don't mistake our thought on this matter. The act has helped us, but we are by no means fully recovered, our operations are only about 30 per cent. of capacity. I don't think it has checked wasteful competition, especially in this district. Certainly employment has gained some by this act, in that many million of men have gained employment who otherwise would have been directly on relief. [*Sand and gravel*]

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I THINK that the N.R.A. was correct in theory, that is, that industry should have some measure of self-government and should have some control over the anti-social minorities which are always present in every group of men. I think that the N.R.A. has been very badly administered, that it has inflicted a lot of labor troubles on the country, and that it has got into politics to such an extent that it is now hopeless. Under the circumstances I think the best thing now is to abandon it entirely. [*Cement.*]

FROM association with other men in our industry I believe that the consensus of opinion is that the lime code has been of some value to us. Also, I should say that other industries, particularly manufacturing or basic, believe in the principles of the N. I. R. A. to some extent. While there has not been much effort put forth to promote the continuance of the act, nevertheless, before it expires there will be some pressure on Congress.

The labor provisions of the lime code made but little change in our relationship with employees except to reduce working hours. We did spread employment to a degree. Personnel relationships possibly are somewhat improved, but we have benefited to a large extent and have not noticed any material increase in production costs of our products.

The code has undoubtedly improved competitive conditions in the industry because it has brought to light bad conditions in many plants which were exploiting labor and possibly some protest will be heard from these people because of increasing costs and their opposition to the program. The minimum-wage scale and working hours in the lime code worked no hardship on any one. Our own views are that a longer working week would be better for all concerned, but during this emergency there was no great difficulty in arranging working hours to comply with the code.

The compensation the industry has for adhering to the labor provisions and certain trade practices is to be found in the marketing provisions which have a tendency to stabilize market prices. An industry such as ours would be chaotic if it did not have the multiple-basing-point system which in turn requires the open-price policy and a 5-day stay on price changes. With the multiple-basing-point system and a wide distribution of basing points on which to predicate quotations, marketing areas are set up surrounding basing points, which allows distribution in the freest way and eliminates much cross hauling. The open-price policy requires the publication of prices and enables one manufacturer to meet prices of another manufacturer on a fair, just, and equitable basis. Prices always seek their own level and nothing can work to the disadvantage of the buyer as long as publicity is given to them. In other words, when the price gets too high it only invites competition from outside sources and it is bound to be reduced by increased production.

Probably codes are better adapted to manufacturing industries and some distributive lines than to all industries and commercial enterprises. It is doubtful if local service trades or businesses can be regulated by a code. Too many people rushed into the preparation of codes without the fundamentals established and the result was much dissatisfaction and a breaking down in most instances.

There is no doubt but that legislation will be enacted to continue the N. I. R. A. for at least another two years and we believe that industry generally would like to have it continue, but that codes should be adopted only by voluntary action by those industries which would benefit. [*Lime*]

* * *

LABOR relations have been mutually pleasant and satisfactory with our company and this condition has been totally undisturbed under code operation.

The number of employees on the payroll has been increased by code requirements about 20 per cent.

Our production costs per unit have increased about 25 per cent. This is due to two factors—an increase of approximately 30 per cent. in the hour rate for common labor and in higher prices for renewal parts and operating supplies.

While quoted prices in our marketing area have not been raised, they have been stabilized materially and secret rebates have largely disappeared, at least competitive conditions so indicate.

In spite of increased cost of production and no increase in quoted prices, stabilization of prices has been reflected in better profits than prior to code operation.

Through the agency of our code committees and code organizations producers have met, become acquainted, found that certain competitors' heads were not adorned with horns, with the result that producers have become more coöperative and association-minded than ever before, very much to the benefit of the industry as a whole.

While the machinery set up in Code 109 for limiting new production was most difficult of accomplishment, four such "permissive" areas were set up in the United States. They were small and the temporary authority granted was not renewed in 1935 and it is my understanding they will not be renewed, principally due to the almost certainty that a test case could not be sustained in the courts.

I do favor the extension of the law to cover reasonable maximum hours, minimum wages, elimination of unfair trade practices and reasonable open-price policies with sufficient time-lag to prevent last-minute "chiseling." The new law must, however, be carefully surveyed by the legal department, so that its provisions will not be in danger of almost certain overruling by the courts, as now is the case. It must be known that the law can be enforced both as to its general provisions and in the collection of legally-assessed code dues. The present condition of uncertainty is intolerable and makes effective operation of the codes impossible, with the general impression that many of the code provisions are unconstitutional. . . .

Statistics prove and our personal observations permit no other statement from me than that the law has contributed to an increase in the general purchasing power. As outlined above it has aided in recovery at our plants and with other associated industries, but would have gone much farther in that direction had it early been clothed with court approval and if a proper spirit of coöperation had been given by the various agencies of the Federal government and of the states and other subdivisions of government.

There have been many violations of the fair-practice provisions, especially in "contingent selling," such as tying the sale of one product with the sale of another, contingent sales based on the loan of equipment or the performance of other services. Such violations are often clearly known but impossible to prove. [*Sand and gravel*]

* * *

THE opinion in this district is that if the N.I.R.A. was enforced it would be a great thing. If not, we are a great deal inclined to agree with Gen. Johnson. It works quite a hardship on the parties living up to it if not enforced. [*Ready-mixed concrete*]

* * *

MY own company's experience is that we have benefited materially from the operations of the code under N.R.A. We have experienced no labor troubles, and there has been a slight increase in employment with nominal increases in production costs. We have not received any actual increase in prices. However, our prices have been fairly well stabilized. Our competitive relations with other members of the industry have been much more satisfactory, principally due to the fact that we contact each other more and these contacts no doubt bring about a better understanding.

I can see very little change in new-plant construction because of the fact that new-plant construction is generally a result of an unusual volume occurring at some particular point. In this respect it does not seem to make any difference whether or not there is a future market, because those contemplating new plants build on the consumption at hand and take a chance on the future. This evil will, in my opinion, never be stopped without some form of control, over either the production or the capital investments in new plants.

I am in favor of extension generally of the principles of the N.I.R.A. with modifications. The principal modification of the act should be to harmonize its provisions and legal phases with governmental statutes.

Local self-determination should be made a fact rather than a theory. A most unusual amount of our troubles has been brought about by the inability of the code agencies to effect coördination with the various governmental bureaus, in addition to the fact that the governmental bureaus themselves will not harmonize with each other. It is my opinion, however, that these difficulties are a natural sequence to such a large undertaking as the recovery act; and only time and experience will smooth out the wrinkles. I believe there are a lot of good features in the N.I.R.A. and also some bad ones; and my opinion is that we should salvage the good and discard the bad.

I believe that it is an undeniable fact that the increased employment and wages brought about by the N.R.A. have increased the general purchasing power and have assisted in the recovery of business in general.

Further, I believe also that it has been fairly successful in checking wasteful production and cut-throat competition. . . . I believe the N.I.R.A. itself has instilled confidence in the people; but this confidence has been minimized by the disorganized activities and opinions as to handling of relief money and other legislation.

I can say from experience and without fear of contradiction that 90 per cent. of the members of our industry in the four states of Oregon, Washington, Idaho, and Montana desire to and are complying with the fair-practice provisions of our code; that about 5 per cent. violate the provisions because of lack of knowledge and a natural tendency to be a little smarter than the other fellow; and the other 5 per cent. are the irreconcilables, "chiselers," and unprincipled men that never will live straight or be satisfied with any law of any kind. It is to be noted also that this last-mentioned 5 per cent. are the ones who holler the longest and the loudest against the provisions of the act and the manner in which it is being administered. [*Crushed stone and sand and gravel*]

* * *

FROM a broad viewpoint I am in favor of an extension of the recovery act. My opinion is also that it would be for the best interest of the general public for this act to be slightly modified and then extended for another two-year period. [*Cement*]

* * *

THE N.I.R.A. has been a successful answer to the vital question of labor wage, affording labor perhaps its just return without the former methods of reducing labor to way beyond the necessity.

As far as controlling industry, it is my opinion that it is impossible to legislate business for all, the weak and the strong alike, and that certain processes of elimination must be had to keep healthy business. Under an N.R.A. set-up the inefficient are packed along to the detriment of those who are efficient, capable, and energetic.

Certain factors of N.R.A., particularly labor, have naturally increased costs. The fixation of prices by industry doubtless meant increased profits or at least getting from the red into the black on the part of industry, yet in our own particular construction business, the competition is as vigorous as ever.

It is my opinion that N.R.A. has served its purpose, that industry has seen the light of day and that business will and can carry on from here. [*Crushed stone, gravel and ready-mixed concrete*]

* * *

I HAVE never been in sympathy with the N. R. A. movement or any of the other "experiments." I firmly believe that if government would let business and industry alone the country would rapidly get on its feet. As I see it, it is the ever-present threat of government interference that is delaying the recovery we all so earnestly hope for. [*Crushed stone.*]

The dual crushed-stone plant with quarry in background. Note inclination of strata.

Bucket-elevator from crushers to screens. Belt-conveyor in center returns oversize to crusher.

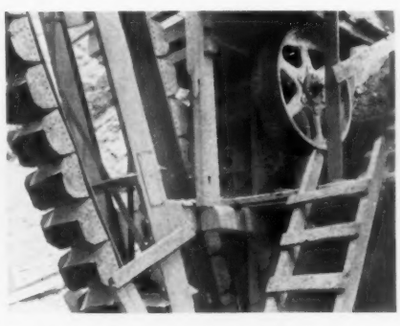
Two Complete Crushed-Stone Plant Units Can Be Run as One Operation

High Crushing Efficiency Obtained by Thorough Reduction of Stone in Quarry

A SMALL crushed-stone plant of unusually flexible design is operated by Smith Bros. near Winfield, Pa. This company originally engaged in contracting and built part of the present plant in 1931 to supply material for its road contracts in this section. When the Pinchot rural-road program began to function in 1932, however, the demand for stone increased to such an extent that the company decided to enlarge the plant and engage in the commercial production of stone. The plant, as it now stands, can be operated as one plant with recrushing and rescreening facilities or as two distinct plants. In the latter case the operations have a capacity of 100 tons per hr. D. B. Owens is superintendent of this plant and is responsible for the many original features in its design and operation.

The quarry was originally opened over 25 years ago to supply flux for blast-furnaces in the vicinity. These furnaces were abandoned but some quarrying was done up to 15 years ago for small lime kilns which were also abandoned. The deposit is a laminated limestone similar to that operated on a larger scale at Naginey, Pa. The overburden is light and is removed during the slack season by the quarry shovel and trucks. The stone strata are inclined at about 45 deg. and the quarry face, now 95 ft. high, is worked at right angles to the line of stratification. Blast holes are drilled in a single row with 16-ft. spacing and a 16-ft. bite at the top of the face. Formerly 9 holes were detonated at one time across the entire face but it was found that better end breakage was obtained by shooting only 2 holes at once. Holes are loaded with du Pont Gelex 60 near the bottom, Gelex 40 near the center and Gelex No. 2 at the top of the holes. Du Pont caps and a du Pont electric blasting machine are used. About 3½ tons of stone is obtained to the pound of explosive. Secondary drilling is done with Cleveland jackhammers equipped with Timken No. 3

The 1¼-cu.yd. gasoline shovel which loads stone in quarry.



One of the two jaw crushers with elevator to vibrating screen.

One of the two triple-deck vibrating sizing screens and elevator.

Some of the ten 4-ton dump trucks owned by the company which are used to deliver crushed stone.

One of the crushers with grizzly at right. Drilling was being done for addition of washing facilities.

detachable bits. Du Pont H1 and H4 explosives are used for secondary shooting and as many as 200 holes are detonated at one time, using Bickford hot-wire lighters. Air for the jackhammers is supplied by a Chicago Pneumatic portable gasoline-driven air-compressor.

Stone is loaded by an Osgood 1¼-cu.yd. gasoline shovel into five motor trucks fitted with 4-cu.yd. steel dump bodies. These back up an incline to discharge into either of the two crushers. The top of the incline is crowned so that the truck is leaning backward when in place for discharge, speeding up the discharge by reducing the hoist lift.

Ordinarily the trucks take the stone to the original plant. A 2½-in. bar grizzly feeds the oversize into a Good Roads 10-in. by 40-in. jaw crusher. Material passing the grizzly, together with the crusher product, is taken by a Kennedy-Van Saun belt-bucket elevator to the top of the plant. This elevator has 10-in. by 12-in. by 21-in. buckets and operates on 39-ft. centers. It feeds a Kennedy-Van Saun 3-ft. 6-in. by 7-ft. triple-deck vibrating screen. Ordinarily the three smaller sizes produced go direct to storage and the oversize from the top deck is chuted to a short belt-conveyor feeding the crusher of the new section of the plant.

This section is also arranged so that trucks can discharge the stone from the quarry over a grizzly into the 10-in. by 30-in. Good Roads jaw crusher. Another Kennedy-Van Saun elevator feeds a 3-ft. by 7-ft. triple-deck screen of the same make. The oversize goes back through the crusher and the three finished sizes are chuted into storage-bins. Trucks are loaded under the bins through lever-operated sliding gates, which slide on the flanges of the I-beams supporting the bin floors.

All shipments are made in 19 trucks owned by the company. Of these, 10 are General Motors 4-ton machines and 9 are Chevrolets. All are equipped with United States Rubber Co. pneumatic tires.

Although the plant usually operates as one unit, it is sometimes necessary, when there is a large demand for a certain size of material, to operate as two separate plants in order to secure the greatest possible capacity. Also, should there be a breakdown in one of the plant units, the other can continue to operate independently. Both crushers ordinarily operate at 300 r.p.m. but when the 10-in. by 30-in. crusher is used as a recrusher, it is speeded up by installing a larger pulley on its motor.

Superintendent Owens has found it economical to use enough explosive in primary blasting to break the stone into comparatively small fragments. The added blasting cost, he finds, is made up several times by the savings in secondary drilling and blasting and the feeding of smaller-sized stones to the crushers. An added advantage is the elimination of delays in the quarry due to the necessity of handling large rocks. Individual electric motors, inclosed with wire screen for protection from stones, drive the plant equipment.

At present a small addition is being made to the plant for cleaning dirty stone. This will consist of a small revolving screen, an elevator and a bin. The company also operates a small screening plant at the slag dump remaining at the site of the old blast-furnaces.

Magnesite Production in 1934

During 1934 production of 100,973 short tons of crude magnesite was reported from three mines in California and one in Washington. This was a decrease of 6.7 per cent. from the quantity mined in 1933 (108,187 tons), but it still showed a substantial increase over 1932 (38,462 tons).

On September 1, 1934, the California Chemical Corp., Sierra Magnesite Co., Ltd., and Industrial Chemical Corp., Ltd., were consolidated into a single corporations known as California Chemical Co. (executive offices, 220 Bush Street, San Francisco, Cal.), but it was announced that the various plants of the former organizations would continue to operate as units of the new company.

MEN OF THE INDUSTRY

E. GUY SUTTON

E. GUY SUTTON, vice-president and secretary of the Neal Gravel Co., Mattoon, Ill., has been identified with the sand-and-gravel business since 1906. He has been especially active in the work of the national and local sand-and-gravel trade associations. He was secretary of the National Sand & Gravel Assn. from 1918 to 1922 and during the war served as secretary of the War Service Committee on Mineral Aggregates. Mr. Sutton has devoted much time in connection with the formation and the administration of the code for the Crushed Stone, Sand and Gravel, and Slag Industries and is a member of the Code Authority and other code administrative committees.

Personal Mention

Joseph S. Yike has been appointed chief chemist of the Great Lakes Portland Cement Corp., Buffalo, N. Y., succeeding **D. W. Yike** who is now chief chemist of the Volunteer Portland Cement Co., Knoxville, Tenn.

L. S. Trainor of the National Lime Assn. staff read a paper entitled "Trends in the Utilization of Lime and Lime Products" before the third annual Illinois Mineral Industries Conference which was held at the University of Illinois in Urbana, May 17 and 18.

A. T. Goldbeck, director of the bureau of engineering of the National Crushed Stone Assn., on May 2 spoke before the Municipal Section of the Providence Engineering Society on "Highway Design Brought Up to Date."

Luther G. McConnell, metropolitan sales manager of the Lone Star Cement Co., New York, Inc., a subsidiary of the International Cement Corp., has been appointed to the Board of Education of Yonkers, New York, by Mayor Loehr.

Gunnar Hummel, safety director of the Lone Star Cement Co. plant at Hudson, N. Y., for the past six years, has been appointed a member of the sales staff with offices in New York City.

George E. Youngberg, former service engineer in the Des Moines offices of the Pennsylvania-Dixie Cement Corp., will join the general sales staff at New York. **E. L. Gale,** southwestern Iowa representative, will become special contract representative for the western division with offices at Des Moines.

Gail R. Camblin of Atlanta, Iowa, will take over the southwestern Iowa territory.

J. E. Holveck has been appointed special sales engineer of the Worthington Pump and Machinery Corp. He will operate from the company's Pittsburgh office and extend his activities to the territories of Cleveland, Detroit, Chicago and Buffalo offices. Mr. Holveck was formerly with the staff of Worthington's Holyoke works and later with the Aldrich Pump Co.

Albert C. Bruce, president of the United States Hoffman Machinery Corp., was elected to the Board of Directors of the Worthington Pump and Machinery Corp.

H. F. Boe has been appointed Assistant Eastern District Manager of the Westinghouse Electric & Manufacturing Co. with headquarters at Rockefeller Center, New York City. Mr. Boe has been with Westinghouse since 1901.

C. M. Carman, superintendent of the plant of the Universal Atlas Cement Co. at Independence, Kansas, spoke before the Kansas safety council at Topeka, Kansas, on the value of industrial safety programs. The Governor of Kansas welcomed safety council members from more than twenty counties.

Robert MacFetridge of the Lehigh Portland Cement Co. spoke before a meeting of the Civitan Club at Birmingham, Ala.

J. W. Webster, who has been in the sales division of the New York Belting & Packing Co. in the middle Atlantic States, has been transferred to the territory comprised of Tennessee, Alabama, Florida and Georgia.

C. R. Peregrine, general manager and superintendent of the plant of the Thunder Bay Quarries Co. at Alpena, Mich., recently showed motion pictures which he had taken himself of the quarry in operation, before members of the Rotary Club of Alpena.

O. L. Wall, who has been chief clerk of the New York Belting & Packing Co. office at San Francisco, has been assigned to the sales force of the company in that territory.

N. W. Pickering, president of Farrel-Birmingham Co., Inc., is now touring in Europe. Mr. Pickering will visit the company's representatives in England, France, Sweden, and Norway.

A. E. Perry, president of the Concho Sand and Gravel Co., Inc., sailed for Europe, June 9th, to attend the International Quarry Conference to be held at Buxton, Derbyshire, England.

Obituary

Lorenzo H. Zambrano, 46, president and general manager of Cementos Mexicanos, S.A., died at his home in Monterrey, N. Leon, Mexico, on May 4th after an illness of several months. He had also been active in other fields including banking and construction and at the time of his death was president of Carreteras de Mexico, S.A., the construction company which is building the Laredo-Mexico highway.

Alfred I. du Pont, 70, descendant of the founder of the Du Pont Co., died April 29, 1935, at Jacksonville, Fla. Since 1915, Mr. Du Pont was no longer active in the Du Pont Co., but devoted his time largely to his banking interests in Florida.

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Coming Events

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June 17, 1935, Hot Springs, Va.—Meeting of the Code Authority of the Lime Industry, Homestead Hotel.

June 18, 1935, Hot Springs, Va.—Meeting of the Board of Directors of the National Lime Assn., Homestead Hotel.

June 19-20, 1935, Hot Springs, Va.—Seventeenth Annual Convention of the National Lime Assn., Homestead Hotel.

June 24-28, 1935, Detroit, Mich.—Annual convention, American Society for Testing Materials, Book-Cadillac Hotel.

June 29-30, 1935, Chicago, Ill.—Concurrent and joint meetings of boards of directors of National Crushed Stone, National Sand and Gravel and National Slag Assns., Palmer House.

John Keese Hallock, former assistant sales manager, Pittsburgh, of the Universal Atlas Cement Co., died May 24, 1935. Mr. Hallock had been with the company since 1908.

F. M. Waller, former operator of the Flat Rock Stone Co. at Lancaster, O., died at his home at McDermott, O., May 2, 1935. At the time of his death he was president of the Waller Bros. Stone Co., which operate quarries at McDermott and Sugar Grove.

Hartford B. Goddard, 58, president of the Marietta Concrete Corp., of Marietta, O., died May 12, 1935, following an operation.

Manuel de Meo, 55, was killed April 30, 1935, when he was buried in a pile of sand at the plant of the Goodwin-Gallagher Sand and Gravel Corp. at Port Washington, N. Y.

CORRESPONDENCE

TO THE EDITOR:

In your issue of May, 1935, under "Foreign Developments," you make mention of concrete 1850 years old still standing in Germany. You may be interested to know that a section of this Roman Aqueduct described in this notice was excavated by the writer in Germany and donated to the Smithsonian Institute at Washington where it is now exhibited.

THE HIGH SILICA CEMENT CORP.
E. R. Wilner, *Pres.*
New York, N. Y.

NEW CORPORATIONS

SEYMOUR GRAVEL CO., Seymour, Ind. Capital stock 100 shares @ $10 par value. Incorporators, William L. Ball, Everett D. Murray and Wilbur C. Baldwin. To deal in gravel and building materials.

F. P. MATTERA & SON, INC., Wildwood, N. J. Capital $125,000. Agent, Frank P. Mattera. Cement products.

THE WEST BAUXITE MINING CO., West Bauxite, Ark. Capital $10,000. Incorporators, C. H. McGregor, Little Rock, Ark.; L. J. Harrington.

THE MIDWEST MARBLE CO., Tulsa, Okla. Capital $25,000. Incorporators, J. S. McClure and E. M. Perner.

THE ARKANSAS BAUXITE CORP., West Bauxite, Ark. Capital $30,000. Incorporators, A. B. Priskett, Little Rock, Ark.; L. B. Burrow.

THE SOUTHERN TALC CO., Chatsworth, Ga. To mine and grind talc.

THE ZEPHYRHILL ROCK CO., Zephyrhills, Fla. Incorporators, George G. Crawford and A. A. Gregory.

STANDARD MINERAL CO., Hemp, N. C. Incorporator, R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y. Plant to grind pyrophyllite.

STANDARD PORTLAND CEMENT CO., INC., Dover, Dela. Capital 10,000 shares n.p.v. ($1,000,000). Incorporators, M. M. Lucey, H. I. Brown, L. S. Dorsey, Wilmington, Dela.

BORCO POTASH DEVELOPMENT CORP., Borden County, Tex. Capital $100,000. Incorporators, Franklin L. Mettler, M. E. Mettler and P. M. Gilkey. To develop land for potash and other salt-bearing minerals.

Foreign Developments

Review of Tests for Free Lime in Cement

The outstanding difficulty connected with the determination of free lime in Portland cement is to find the right solvent, for water or any hydrous compound used in the test would show not only the lime originally in a free state but also lime resulting from the decomposition of the cement. As a prelude to report of an exhaustive laboratory investigation of the problem, the literature on the subject is reviewed in a preliminary article. Unsuccessful methods are disregarded, and the article is devoted to Emley's glycerine-alcohol method, Lerch and Bogue's application of it to the analysis of free lime in cement and subsequent modifications by Rathke, Schindler, Jandler and Hoffman; space also is given to the phenol method developed a few years ago by Konarzewski and Lukaszewicz.—Ing. Anton Hanslitschek in *Tonindustrie-Zeitung* 59: 110-111, 144-145, Jan. 28 and Feb. 4, 1935.

Gypsum Coat Found to Protect Against Fire

Extensive experiments on the fireproofing of reinforced concrete, wood and steel with gypsum slabs and gypsum surface coating were described at the Congress for Industrial Chemistry in Paris last year, and are summarized in *Tonindustrie-Zeitung* for April 15, 1935 (59:393-394). Tests were first made in the laboratory with temperatures of 1,100 deg. C., using slabs of varying thickness. As the gypsum slabs consist of the double hydrate, the conversion into the hemi-hydrate begins at 120 deg. C., and so long as this dehydration of the gypsum goes on, the temperature inside the slabs does not pass 160 deg. C. Coverings of even 20 to 30 mm. give considerable protection against fire. The protection is not directly proportional to the thickness of the slab, but increases rapidly with increasing thickness of the slab. For instance, a 20-mm. slab gave a protection of 20 min., while a 30-mm. slab gave a protection of 43 min. This is attributed to the fact that the burned gypsum adheres to the unburned gypsum back of it, and its low heat conductance hinders the transfer of the necessary heat for dehydrating the gypsum back of it. When the dehydration of the gypsum is completed, the temperature increases rapidly, as its only protective function then is its low heat conductance, and its by then cracked and damaged structure lowers even that value.

The laboratory experiments were then supplemented by experiments on a larger scale with wood, concrete and reinforced concrete with gypsum coatings, at temperatures between 1,100 and 1,200 degs. C. It was found that up to the periods determined by the laboratory experiments, the gypsum slabs gave complete protection, but that beyond those times wood, concrete and reinforced concrete back of them were destroyed. It was found specially important to assure a good adhesion of the gypsum to the material below, such as by covering the structure with a wire net before applying the gypsum. To avoid reaction between the gypsum and iron, it is advisable to apply a coating of cement slurry before the gypsum.

Wet Sieving Adequate for Control Purposes

One frequent disadvantage of drying cement for the purpose of the numerous routine screen tests in operating control of a cement plant is that the particles to some extent cohere in lumps which vitiate the results of the sieving, and if the lumps are broken mechanically some of the original cement particles may be reduced in size, which again makes the result of the sieve test incorrect. If the cement plant is operating by the wet process, it is fairly customary to screen the raw mix wet; several theoretical considerations indicate also that cement itself can be satisfactorily screened by mixing it with water to a thin slip and screening it in that condition. A series of comparative experiments with various cements, determining the residues on the standard screens when screened dry and when screened wet, show a very close correspondence of results, adequate not only for the purpose of routine control tests but also for investigating the fineness of a cement according to the standard specifications.—D. Steiner in *Tonindustrie-Zeitung* 59:258, March 7, 1935.

Study Sand-Lime-Brick Time and Temperature

Experiments at the construction engineering laboratory of the Hannover Technical College to determine the maximum strengths that can be attained in sand-lime brick through control of temperature and time of hardening are reported in *Tonindustrie-Zeitung* (59:88-92, February 24, 1935) by Dr.-Ing. Hugo Ippach. The specimens were made from 50 parts by weight of hydrated lime, 50 parts of quartz meal (both being ground to pass the 100-mesh per cm. screen) and 70 quarts of water, and were hardened in a gas-fired kettle with automatic regulation of heat.

The experiments showed that for each temperature there is a maximum strength, dependent on the time of hardening, which can be obtained. Short periods of hardening are necessary for attaining maximum strengths at the higher temperatures, and *vice versa*. Prolonging the hardening period beyond the point which gives the maximum strength brings about a reduction in strength and great variations in strength. Storage of the hardened brick in air apparently gives no increase in strength.

Certain conclusions relating to the theory of the binding process are drawn by the author from the experiments. The formation of colloidal lime-silica compounds may probably be assumed as the primary strength-developing process, while there also takes place a secondary process which tends toward reduction of strength—apparently depending on crystallization of the colloidal calcium-hydrosilicate compounds. Both reactions run simultaneously, and apparently are distinguished by their different reaction to the various temperatures of hardening.

Studies Hydration of Tricalcium Silicate

A comprehensive investigation of the action of water on tricalcium silicate, as a contribution toward determination of the phenomena occurring in the hydration of cement, is reported in detail by Dr. R. Nacken of the Mineralogical and Petrographical Institute of Frankfort University in *Zement* for March 28 and April 4, 1935 (24: 183-191, 214-217). The experiments indicate that when water acts on pure tricalcium silicate states, that at least come very near to a complete heterogeneous equilibrium, are formed. The types 2 $CaO.SiO_2.xH_2O$, $3CaO.SiO_2.xH_2O$ and 1 $CaO.SiO_2.xH_2O$ could be determined with certainty, but the determination of the water content was not in all cases positive. The combinations probably existing are $2CaO.1SiO_2.1H_2O$ (Hillebrandite), $3CaO.2SiO_2.3H_2O$ (Afwillite) and $1CaO.1SiO_2.2H_2O$ (Plombierite); the synthetic production of these materials in unquestioned crystalline form would be needed to settle this question. In a postscript the author points to the work of V. A. Vigfusson, G. N. Bates and T. Thorvaldson, Hydrothermal Synthesis of Calcium Hydrosilicates, *Canadian Journal of Research* 11 (1934), pp. 520-529 as verifying the formation of Hillebrandite in the decomposition of tricalcium silicate. Of the calcium hydrosilicates named, $2CaO.1SiO_2.xH_2O$ and $3CaO.2SiO_2.xH_2O$ are incongruently, $1CaO.1SiO_2.xH_2O$ probably congruently, soluble in contact with water.

Traffic News and Comment

Legislation

In his radio address on April 28, President Roosevelt said, "Not only business recovery but the general economic recovery of the nation will be greatly stimulated by the enactment of legislation designed to improve the status of our transportation agencies. There is need for legislation providing for the regulation of interstate transportation by 'buses and trucks, to regulate transportation by water, new provisions for strengthening our merchant marine and air transport, measures for strengthening the Interstate Commerce Commission to enable it to carry out a rounded conception of the national transportation system in which the benefits of private ownership are retained, while the public stake in these important services is protected by the public's government."

In press conferences since that time he has stated that a special message would be sent to Congress on the subject of transportation, but this has been delayed on account of other legislation, court decisions and other matters that have overshadowed the subject of transportation. With the decision of the Supreme Court making unconstitutional the N. R. A., under which some regulation of trucking had been accomplished, the next few weeks will probably see the administration working toward salvaging as much of the "new deal" as possible, or that part of it relating to social security, and it is possible that Congress might adjourn without enacting any transportation legislation.

Representative Crosser of Ohio has introduced a resolution providing for the continuance of the office of Federal Coördinator of Transportation for another year, and giving the President the power to continue the office for another year beyond that. The position will expire on June 16 next unless there is further legislation continuing the office. Any extension of the term is opposed by the railroads and by the National Industrial Traffic League.

Recent I. C. C. Decisions

Advanced Freight Rates.—Gradually the confusion following the effective date of the tariff of emergency charges is subsiding as the various state commissions are permitting the application of the increases on intrastate traffic, and supplements are being issued making the tariff less difficult to interpret.

Several petitions asking the Commission to reconsider the advanced rate proceedings have been filed with the Commission and have been denied. The National Sand and Gravel Assn., the National Crushed Stone Assn., and the National Slag Assn., have asked for reconsideration and cancellation of emergency charges on crushed stone, sand, gravel and slag and related commodities. Southern producers of crushed stone, sand, gravel and slag, the Birmingham Slag Co., the American Sand & Gravel Co., the Kirkpatrick Sand & Cement Co., the Montgomery Gravel Co., the Roquemore Gravel & Slag Co., the Southeastern Sand & Gravel Co., the Underwood-Walker Co., and the Woodstock Slag Corp. have filed a petition in the court of the Northern District of Alabama, asking the court to enjoin and set aside the Commission's orders in Ex Parte No. 115. The petitioners contend that the orders are not supported by the necessary findings of fact.

After a thirteenth-section hearing had been instituted on account of the refusal of the Ohio Commission to permit the advanced rates to become effective, the Ohio Commission gave the carriers permission to make the rates effective June 1, on 5 days' notice.

In Indiana the state commission suspended the increased rates until August 15, and assigned the suspension case for hearing on May 20. It is likely that thirteenth-section proceedings will be instituted soon in an effort to bring all intrastate rates up to the interstate level.

In some cases the Commission has permitted the carriers to supplement the emergency charge tariff on short notice in order that they might meet competition on certain commodities.

Cement.—In response to fourth-section application No. 15,789, carriers parties to Kipp's I. C. C. No. A-2,538 are authorized to establish and maintain rates on cement from Rapid City, S. D., to destinations in northwestern Iowa, without observing the long-and-short-haul clause of the fourth section, the rates to be constructed on Scale IV rates prescribed in Western Cement Rates, 48 I. C. C. 201, subject to the same terms and conditions as imposed in fourth-section order No. 7,260.—I. C. C. F. S. O. No. 11,889.

Sand.—On further hearing the Commission has found the amount of reparation due complainant under prior findings in 188 I. C. C. 99, on Albany, Elnora and Glenmont, N. Y., to Beaver Dam, Wis., to be $220.10, and has ordered that amount paid not later than July 15.—I. C. C. Docket No. 23,912, Malleable Iron Range Co. v. Ann Arbor.

Examiners' Reports

Sand.—Examiner J. J. Williams on further hearing has recommended that the Commission find the following amounts of reparation due under prior findings in connection with the shipment of molding sand from points in New York and New Jersey to Springfield, Mass., stations, and that the Commission order them paid: Gilbert & Parker Mfg. Co., $1,255.26; Worthington Pump & Machinery Corp., $1,150.03, and three awards from three groups of carriers to the Chapman Valve Mfg. Co. of $13,565.55, $6,711.21 and $1,636.60, in I. C. C. Docket No. 21,133, Chapman Valve Mfg. Co. *v.* B. & A. *et al.*, and Sub. No. 1, Worthington Pump & Machinery Corp. *v.* Pennsylvania *et al.*

Examiner Henry B. Armes proposes that the Commission find the car-load rate on core and molding sand from Millville and Manumuskin, N. J., to Hartford, Conn., imposed on shipments between April 21, 1931, and the effective date of the rates prescribed in Industrial Sand Cases, 1930, in 188 I. C. C. 99, and 204 I. C. C. 159, unreasonable to the extent that it exceeded $3.30 per net ton and award reparation.—I. C. C. Docket No. 26,758, Hartford Electric Steel Corp. *v.* Pennsylvania *et al.*

New Complaints Filed

Ground Limestone.—Reparation is sought in connection with the movement of ground or pulverized limestone from Engle, W. Va., and York and Anville, Pa., to Cerney's Point and Gibbstown, N. J., and Hillside Junction, Pa., complainant alleging violation of Sec. 1, in a complaint filed by Robert W. Marshall, traffic counsel, in I. C. C. Docket No. 26,968, E. I. duPont de Nemours & Co., Inc., Wilmington, Del. *v.* B. & O. *et al.*

Lime.—On an allegation of violation new rates are sought on lime from Gibsonburg and Cold Springs, Ohio, to destinations in southern territory, in a complaint filed by W. W. Sprague, traffic manager of complainant. This case was heard in Pittsburgh, Pa., on May 24, by Examiner Shanafelt.—I. C. C. Docket No. 26,937, National Mortar & Supply Co., Pittsburgh, Pa., *v.* Pennsylvania *et al.*

Sand.—New rates and reparation are prayed for in a complaint charging unreasonable rates and charges on sand from points in New York and New Jersey to destinations in New Britain, Conn., filed by Jesse F. Atwater, complainant's manager of transportation, in I. C. C. Docket No. 26,938, American Hardware Corp., New Britain, Conn. *v.* West Shore *et al.*

Alleging unreasonable rates on sand from Gansevoort, Delmar, Slingerlands, Feura Bush and Saratoga Springs, N. Y., to New Britain, Conn., new rates and reparation are sought in a complaint filed by John J. Hickey, attorney, in I. C. C. Docket No. 26,947, Landers Frary & Clark, New Britain, Conn. *v.* N. Y. N. H. & H. *et al.*

New rates and reparation are sought and unreasonable rates and charges alleged on sand used for foundry purposes from points in New York, New Jersey, Rhode Island and Massachusetts, to Oak Street, Mass., on the B. & A., in a complaint filed by Charles E. Vose, practitioner, in I. C. C. Docket No. 26,952, Springfield Foundry Co., Springfield, Mass. *v.* B. & A. *et al.*

Alleging violation of Sec. 1, new rates and reparation are sought in connection with the shipment of sand since November 11, 1931, from points in New York and New Jersey to Southington, Conn., in a complaint filed by Jesse F. Atwater, practitioner, in I. C. C. Docket No. 26,962, Peck, Stow & Wilcox Co., Southington, Conn. *v.* West Shore *et al.*

Water Rates

Silica Sand.—In a case before the Shipping Board Bureau Secretary of Commerce Roper has found not justified a proposed schedule of the Nelson Steamship Co., reducing the rate on silica sand in bulk in lots of not less than 500 net tons, for the manufacture of glass and glassware, from Baltimore, Md., to California, Oregon and Washington ports, from $2.73 to $2.50 per net ton. This new rate was restricted to application only when a contract had been executed between shipper and carrier. This finding is without prejudice to the filing of a new schedule making the rate effective without requiring a contract. This reduced rate was filed to permit a shipper having plants in West Virginia, Pennsylvania and New Jersey to meet the competition of Belgian producers who are shipping glass sand to the Pacific Coast destinations at a cost of about $5.22 a net ton. The American-Hawaiian Steamship Co. and nine other carriers protested this restricted rate, which would have excluded them from participating in the traffic.—U. S. S. B. Docket No. 177.

New Huron Industries Co. To Continue Production

The entire properties, assets, patents, drawings and patterns of Huron Industries, Inc., Alpena, Mich., have been purchased by two of the original stockholders. The new company will be known as the Huron Industries Co., and will continue to manufacture the Huron Heavi-duty vibrating screen, pulverized material feeder, grizzlies and seal rings for rotary kilns as well as operate a general jobbing foundry and machine shop. The new owners are also putting in a complete line of mill supplies for the convenience of manufacturing concerns in northeastern Michigan.

Walsh Equipment Co. Opens Muskingum Valley Branch

The Walsh Equipment Co. of 3088 W. 106th St., Cleveland, O., has opened a branch at 933 N. Wooster Av., Dover, O., in charge of P. L. Patterson. This action has been taken to provide better service for customers in that part of the state and to facilitate work on the Muskingum Valley project.

The Productive Equipment Corp., Chicago, Ill., has appointed Mayer & Oswald, 332 So. LaSalle St., Chicago, as its representatives in the Chicago area.

Recent Patents

AMERICAN

Drilling

Rock drill. Albert Feucht, Cleveland, O., assignor to Cleveland, O. No. 1,942,690.

Rock drill. John E. Renfer, Cleveland, O., assignor to Cleveland Rock Drill Co. No. 1,942,730.

Rock drill. Edward J. Warren, Denver, Colo. No. 1,932,259.

Rock-drilling apparatus. Elmer G. Gartin, assignor to Sullivan Machinery Co. No. 1,929,420.

Rock-drilling device. Elmer G. Gartin, Claremont, N. H., assignor to Sullivan Machinery Co. No. 1,929,419.

Rock drill. Henry Tardiff, Claremont, N. H., assignor to Sullivan Machinery Co. No. 1,929,457.

Drilling mechanism. Henry Tardiff, assignor to Sullivan Machinery Co. No. 1,929,458.

Excavating and Loading

Sand-dredging apparatus. Edward J. Crowells, Detroit, Mich. No. 1,940,488.

Excavator. Kurt Wissmann, Duisburg, Germany. No. 1,940,616.

Grab-bucket. William C. Swalley, Cleveland, O., assignor to Wellman Engineering Co. No. 1,941,515.

Power shovel. Thomas Gibby, Denver, Colo. No. 1,937,016.

Drag bucket. Jesse F. Yaun, Baton Rouge, La. No. 1,938,163.

Scraper bucket. Leslie P. Green, Chicago, Ill. No. 1,932,175.

Dragline bucket. Thomas A. Ratkowski, Chicago Heights, Ill., assignor to American Manganese Steel Co. No. 1,933,759.

Drive-gearing for shovel cranes. Leslie A. Russell, Milwaukee, Wis., assignor to Koehring Co. No. 1,933,874.

Dipper tooth. Max M. Brodersen, Los Angeles, Cal., assignor to Killifer Mfg. Corp., same place. No. 1,927,818.

Fair lead for excavators. Mitchell L. Fyske, assignor to Bucyrus-Erie Co. No. 1,929,417.

Power shovel. William W. Sloane, Chicago, Ill., assignor to Goodman Mfg. Co. No. 1,930,694.

Dipper tooth. Lesher W. Van Buskirk, Easton, Pa. No. 1,925,420.

Bucket elevator. Elmer C. Slater, Columbus, O., assignor to Jeffrey Mfg. Co. No. 1,925,024.

Excavator. Neal C. Nickerson, Carlton, Minn. No. 1,933,924.

Gypsum

Process of calcining gypsum. Wilbur S. Randel and Manvel C. Dailey, Chicago, Ill., assignors to United States Gypsum Co. No. 1,931,240.

Gypsum concrete mixture. Waldemar C. Hansen, Westfield, N. J., assignor to American Cynamid Co., New York, N. Y. No. 1,923,370.

Lime

Treating of lime. William J. Kuntz, Aspinwall, Pa. No. 1,929,591.

Method and apparatus for burning limestone and recovery of carbon dioxide. Edward P. Gillette, Toledo, O., assignor to Gillette Research Corp., same place. No. 1,923,084.

Mining

Mining machine. Leon E. Simmons, Claremont, N. H., assignor to Sullivan Machinery Co. No. 1,931,560.

Miscellaneous

Attemperator for rotary kilns and like. Johan S. Fasting, Valby, Denmark, assignor to F. L. Smidth & Co., New York, N. Y. No. 1,942,140.

Apparatus for comminuting materials. Floyd S. Youtsey, Collinsville, Ill. No. 1,936,742.

Material-handling apparatus. Ernest P. Jaggard, Frankstown Township, Pa. No. 1,932,897.

Creeping traction. Mitchell L. Fyske, Milwaukee, Wis., assignors to Bucyrus-Erie Co. No. 1,929,416.

Screening and Classifying

Process and mechanism for separating intermixed divided materials. Richard Peale, St. Benedict, Pa., assignor to Peale-Davis Co. No. 1,941,490.

Vibrating screen. Theodore B. Hetzel, West Chester, Pa., assignor to Link-Belt Co. No. 1,931,657.

Fine-mesh screen box. Edward C. Berghoefer, Los Angeles, Cal., assignor to Link-Belt Co. No. 1,932,920.

Air-separators. Thomas J. Sturtevant, Wellesley, Mass., assignor to Sturtevant Mill Co. Nos. 1,933,604; 1,933,605 and 1,933,606.

Method of fractionally separating pulverulent materials. Arthur B. Cummins, Plainfield, N. J., assignor to Celite Corp., New York, N. Y. No. 1,934,410.

Classifying door for power shovels. Walter A. Erickson, Monte Vista, Colo. No. 1,935,288.

Vibratory screen. Walter E. Lippmann, Milwaukee, Wis. No. 1,929,249.

Process and apparatus for separating intermixed divided materials. Richard Peale and Rembrandt Peale, Jr., St. Benedict, Pa., assignors to Peale-Davis Co. No. 1,931,008.

Screening apparatus. Samuel D. Robins, Hewlett, N. Y., assignor to Robins Conveying Belt Co., Passaic, N. J. No. 1,923,229.

Process and mechanism for separating intermixed divided materials. Kenneth Davis, Ebensburg, Pa., assignor to Peale-Davis Co. No. 1,923,917.

Process and mechanism for separating intermixed divided materials. Richard Peale and Rembrandt Peale, Jr., St. Benedict, Pa., assignors to Peale-Davis Co. No. 1,923,951.

Washing

Sand-washing machine. Harry A. Friberg, Winchester, Mass. No. 1,943,861.

Sand washer. John R. Sheffield, Jr., New York, N. Y., assignor to Dorr Co., same place. No. 1,938,937.

Fabric washer construction for crushing machinery and like. Edgar B. Symons, Hollywood, Cal., assignor to Nordberg Mfg. Co. No. 1,931,633.

FOREIGN

Cooling

Cooler as elongation of rotary kiln. Arno Andreas. German 579,962.

Dust Collectors

Dust collectors or separators. D. W. Molins. British 391,577.

Centrifugal dust separator. Hermann van Tongeren, Delft, Holland. German 579,130

Crushing and Grinding

Grinding mills. Societe Francaise des Constructions Babcock et Wilcox. French 755,674.

Jaw Crushers. Ateliers Neyret-Beylier. French 756,892.

Hammer mill. Erie City Iron Works, Erie, Pa. German 586,297.

Roll crusher for clay and like materials. Otto Lefnaer, Vienna. German 585,496.

Crusher. Adolf Steinbrückner, Wanheimerort, Duisburg. German 585,915.

Crusher for producing crushed stone. Joseph Vögele A. G. and Hans Held, Mannheim. German 580,950.

Multiple-compartment mill. Fried. Krupp Grusonwerk A. G., Buckau, Magdeburg. German 585,472.

Feeder for edge-runner. Graue G.m.b.H., Wülfel, Hannover. German 585,471.

Drying

Feed and discharge apparatus for rotary dryers or coolers. Friedrich Uhde, Dortmund. German 580,626.

Rotary dryer. Benno Schilde Maschinenbau A. G., Hersfeld. German 584,677.

Dryer for material tending to cake. Maschinenfabrik Friedrich Haas G.m.b.H., Lennep, Rhineland, and Ludwig Honigmann, Aachen. German 584,503.

Rotary dryer. Heinrich Kröger, Leopoldshall, Strassfurt. German 586,503.

Gypsum

Producing high-strength gypsum. Berliner Gipswerk L. Mundt, Berlin. German 573,118.

Operation of gypsum kettles. Mussat, Binot & Cie., Gagny, Seine-et-Oise, France. German 577,104, addition to 541,140.

Porous plaster from anhydrite, a small quantity of Portland cement, and gas-producing ingredients and accelerators. T. Coxon, Imperial Chemical Industries, Ltd., and V. Lefebure. British 402,101.

Plasters and mortars. Gypsum Mines, Ltd., and R. Collins, Robertsbridge, Sussex. British 402,810.

Manufacture of porous plaster. Imperial Chemical Industries, Ltd. French 755,813.

Gypsum mixture. Victor Lefebure, London. German 586,331.

Kilns

Rotary kilns. J. S. Fasting. French 756,807.

Apparatus for burning cement. Lepol, Internationale Patentverwertungsgesellschaft m.b.H., Berlin, and N. V. Solopol, Ingenieur-Büro tot Exploitatie van het System Polysius, The Hague. German 584,937.

Device for spraying slurry into rotary kilns. Fellner & Ziegler A. G., Frankfurt a.M. German 584,758.

Rotary kiln. Fellner & Ziegler A. G. German 585,799.

Material-Handling

Process for handling pulverulent or fine material. International Cement Gun Com-Company G.m.b.H. French 753,084.

Feeding granular materials. Corrie & Co., Ltd., London. British 400,617 and 400,664.

Feeding devices for granular, etc., materials. Mag. Mühlenbau und Industrie A. G., Brunswick, Germany. British 403,936.

Feeders for granular materials. J. Coultas, Ltd., and K. Roberts, Grantham, Lincolnshire. British 407,423.

Endless-belt conveyors. J. B. Carrie & Co., Ltd., London (A. Baillot et Cie., Paris). British 400,617 and 400,664.

Endless-chain conveyors. R. C. V. Cook, Bieldside, Aberdeenshire. British 400,661.

Pneumatic conveyors. H. Simon, Ltd., and C. Bentham, Cheshire. British 401,053.

Jigging conveyors. E. Hughes, Leicester. British 402,233.

Endless-belt conveyors. Mavor & Coulson, Ltd., and J. Thomson, Glasgow. British 402,519.

Endless-belt conveyors. J. E. D. Speakman, J. V. Wallace and Newton, Chambers & Co., Ltd., Sheffield. British 402,688.

Apparatus for stacking on a waste dump. Orenstein & Koppel A. G., Berlin. British 402,704.

Endless-belt conveyors. A. Abrahamsen and J. E. Hansen, Lillesand, Norway. British 403,015.

Screw Conveyors. Fuller Co., Catasauqua, Pa. British 402,998.

Jigging conveyors. T. G. Nyborg and M. F. Higgins, Worcester. British 403,499.

Grab buckets. D. J. Barnard, Barking, Essex. British 404,295.

Portable belt conveyor. J. N. O. Rogers and T. Charlton, Silksworth near Sunderland. British 404,694.

Rotary car dumpers. W. H. Dickinson, Burton-on-Trent. British 406,070.

Dragscraper apparatus. J. L. Holman, A. T. Holman, and Holman Bros., Ltd., Camborne, Cornwall. British 407,003.

Grab buckets. E. J. Soens, Liverpool. British 407,954.

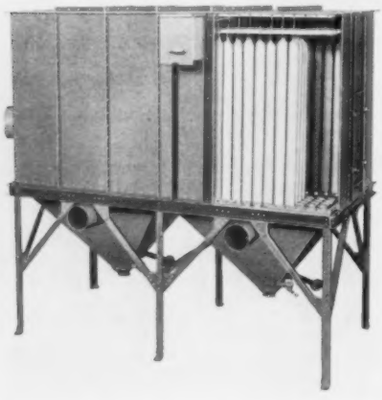
Jigging Conveyors. F. Coleman, Derby. British 407,996.

Stripping and conveying apparatus. Maschinenfabrik Augsburg-Nürnberg A. G., Nürnberg. German 584,944.

New Machinery and Supplies

Dust Filter Designed for Accessibility of All Bags

Ruemelin Mfg. Co. of Milwaukee, Wis., makers of Dust Filters for the past 15 years have recently improved and patented new features on their filters. Their filters are principally used for eliminating the dust hazard or reclaiming valuable dusts from exhaust or ventilating systems. The filter tubes are enclosed in a heavy-gauge steel housing which is rigidly re-enforced to withstand high vacuum. A large door is provided in the end of the housing and an aisleway runs the entire length for acces-



Bag-type dust collector with part of housing removed to show interior.

sibility of all bags. The dust hoppers have rubber-seated dust valves and the valve levers agitate the dust inside the hopper to prevent arching. When desired, a fan and motor housing can be furnished as an extension to the filter housing.

These filters are made in standard units of 1830, 1375 and 915 sq. ft. cloth area and are based on a ratio of 3 cu. ft. of air per minute per sq. ft. of cloth. Bags are suspended from hanger rods attached to the ceiling of the housing and the bottoms of the bags are telescoped over shouldered collars and provided with felt seals and special wire clamps. The shaking mechanism consists of an electric motor and cut gear transmission which transmits a rapid vibrating action to the bags thru the shaker rods.

The filter operates in the usual manner. The suction of the exhaust fan delivers the dusty air into the dust hopper where heavy particles are removed. The clean air passes thru the cloth bags depositing all smoky dust on the inside surface of the bags. A settling or pre-separation chamber can be furnished where it is advisable to remove the heavy material before it is filtered thru the cloth tubes.

Compact Walking Dragline With Low Bearing Pressure

The Bucyrus-Erie Co., South Milwaukee, Wis., has added to its l ne the new Bucyrus - Monighan 5-W walking dragline which is said to be unusually compact and to have an extremely low bearing pressure. Ease of shipment was an important consideration in the design of this machine. The center section of the revolving frame with all principal machinery assembled in place is shipped in one unit on one car.

The swing mechanism and fuel oil tanks are below the deck and the machine is so balanced that little counterweight is required. This elimination of excess weight further achieved by electric welded construction reduces the ground bearing pres-

Walking dragline of unusually compact design.

sure to 4½ lb. to the square inch. Sensitive controls permit rapid operation and, like all other Bucyrus-Monighan walking draglines the direction of travel is governed by pointing the boom. While digging the machine rests on its large circular base.

Exposed Parts of Chain Hoist Have Zinc Coating

Announcement of an improved model chain hoist is made by the Wright Manufacturing Division of the American Chain Co., Inc., York, Pa. Improvements have been made in the previous model to increase its durability, efficiency and usefulness.

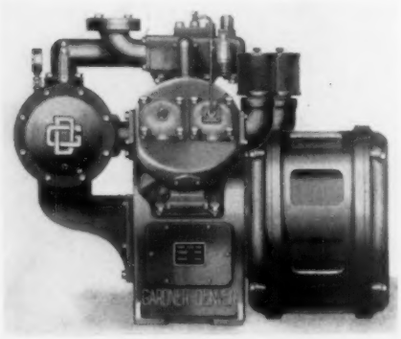
One innovation is zinc coating of all exposed parts, making the hoist practical for outdoor use and for service in moist and other corrosive atmospheres. The addition for precision ball bearings with integral grease seals supporting all moving parts, is said to increase the efficiency by 10 per cent. over former models. Wear is reduced on all vital moving parts by a system of continuous lubrication of the positively sealed precision bearings. Additional minor improvements include hardened pawl tip, improved load chain guard and ball spring covers on oil tubes.

New Line of Compressors With Many Improvements

Available in sizes ranging from 113 to 194 cu. ft. per min. displacements, a new line of 3-cyl. air compressors, known as "WBR" is announced by the Gardner-Denver Co., Quincy, Ill. These new compressors, which are part of the complete WB line, combine a number of unusual features of design which, Gardner-Denver officials state, materially increase their efficiency and value.

One of the most distinctive features of the WBR compressor is the use of two small low-pressure cylinders, instead of one large one, resulting in lower air temperature. Cylinder walls are water-cooled to provide lower wall temperature with better lubrication and longer life. In addition, the two-stage construction, with water-cooled cylinders and intercooler, is said to assure sustained high efficiency. A force feed pressure lubrication system is used, oil being delivered to the bearings by a plunger pump. Pistons and cylinder walls are lubricated by the oil spray of the crank pin. The compressor may be run in either direction.

The main bearings are of the Timken heavy-duty, tapered roller type. The crank shaft itself is of chrome-nickel-molybdenum alloy, ground to size and accurately counterweighed for best running balance. Connecting rods are of drop forged steel, heat treated, having steel backed, babbitt



Compressor with one high-pressure and two low-pressure cylinders.

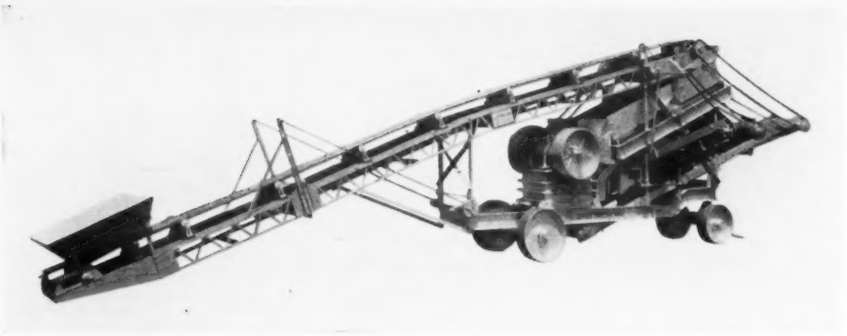
lined, ribbon-type crank pin bearings. Pistons are of the light-weight automotive type, ground to fit the cylinder bore, and three compression and one oil ring are used on each piston. Valves are of the "cushioned" noiseless automotive plate type, the cushioning being accomplished by the use of an air cushion pocket in the guard or bumper over each valve.

Portable Plant Is Self-Contained on One Truck

The Lippmann Engineering Works, Milwaukee, Wis., recently supplied eight portable crushing and screening plants to the United States Government for use in the Pacific Northwest. Each plant is mounted and self-contained on a steel truck with steel wheels which are equipped with Timken roller bearings. The entire plant was designed and all equipment manufactured by the company.

The 10- by 24-in. roller-bearing jaw crusher has a one-piece alloy steel frame. It is fitted with Timken roller bearings and manganese steel liners and jaw dies. The vibrating screen is a 3- by 10-ft. double-deck unit of the positive eccentric type. It has SKF roller bearings and is driven through Allis-Chalmers Texrope. Each plant has a 24-in. main feed conveyor and 18-in. sand and stone discharge conveyors all of which have Timken roller-bearing idlers and head and tail pulleys. The conveyor belts were made by the Thermoid Rubber Co. The conveyors are of the fold-

Eight Lippman portable crushing and screening plants assembled at plant before shipment to Pacific Coast where they will be used for government work.



Portable crushing and screening plant which is self-contained on a single truck. Main feed conveyor is shown in position for use.

ing type operated by hand winches.

The entire unit is so arranged that it can be driven from a separate power plant or from one mounted on the chassis. The motor is driven direct through flat or V-belt and all other equipment except the screen is driven from the crusher through roller chain drives. All of the transmission equipment is also equipped with anti-friction bearings. The plant is so arranged that the crusher opening can be changed while the crusher is in operation. The fine material can be discharged together with the coarse gravel or separately and this change can be made without stopping the plant. The plant set up is about 53 ft. in length. When folded up it is 40 ft. long, 5 ft. 8 in. wide and 13 ft. high.

Develop Method of Arc-Welding Manganese Parts

The Stulz-Sickles Co., Newark, N. J., manufactures Manganal 11 to 13½ per cent. nickel manganese steel welding electrodes, applicator bars and forged wedges

Jaw crusher plate shown after welding on nickel manganese applicator bars.

for reclaiming worn down and broken parts such as crusher plates, gyratory crusher bells, buckets, centrifugal pump shells, shovel and dipper teeth, etc. The rebuilding of these parts with applicator bars and forged wedges is said to be a forward step in the reclaiming of these parts because of the fact that the comparatively small amount of heat required practically eliminates danger of warpage. The applicator bars are said to be particularly adapted to use on flat surfaces and the forged wedges on such parts as shovel and dipper teeth.

Small Classifier Has All Features of Large Units

The Hardinge Co., York, Pa., announces the production of a small or laboratory size model of the Hardinge Counter-Current classifier which is 18 in. in diameter by 4 ft. long. This unit is said to have all of the features of the larger classifiers made by this company and has a sand discharge capacity of 4500 lb. per hr. and an overflow capacity for free settling solids of 2000 lb. per hr. when making 28-mesh separation.

New Bucket Loader With Many Exclusive Features

The Barber-Greene Co., Aurora, Ill., announces the Model 82 bucket loader which is said to embody many new and exclusive features in its design. One of the features is the tank-type chassis frame which ties the main frame into a compact integral unit of great strength and accessibility and completely houses the driving machinery. Synchronized feeding is attained through a

New bucket loader with tank type chassis frame.

special arrangement of the spiral feeding screws. A new parallelogram axle together with 3-point suspension gives knee action and always keeps the crawlers parallel.

The design of this loader includes the patented floating boom principle which lets the crowding thrust go direct from the crawlers to the feeding end and not through the main frame. The patented overload-release sprocket protects the machine from overloads, slipping when an overload occurs and automatically resetting itself. Other features include quick-acting, self-locking swivel spout; welded, high-backed, closely-spaced buckets; hard-facing on bucket lips; slow crowding speeds; fast traveling speeds.

Bucket Combines Greater Strength With Less Weight

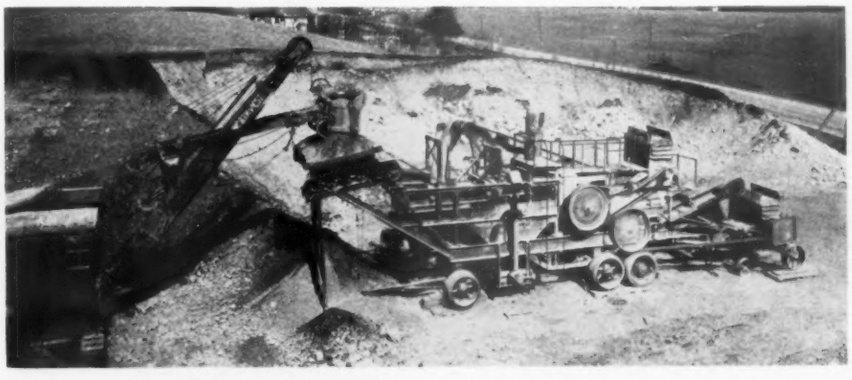
The Wellman Engineering Co. recently designed and built an entirely new type Williams clamshell dredging bucket of 3½ cubic yards capacity. This bucket weighs over 20,000 lb. and is constructed of welded alloy steel normalized for grain structure. It has heat-treated shafting, alloy steel rivets and manganese steel teeth. The welded design utilizing alloy steel is said to have made possible greatly increased

New type clamshell dredging bucket designed to handle heavy rock.

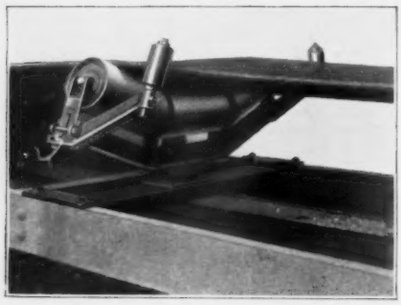
strength with a minimum weight and it is estimated that upkeep expense will be much less than in previous designs due to the high physical values of the materials used in its construction. This bucket was designed to handle heavy rock.

Self-Aligning Idler With Standard Carrying Rolls

The Link-Belt Co., Chicago, Ill., announces the "Positive" self-aligning, anti-friction idler for troughed conveyor belts. This idler is made up of standard belt-carrying rolls mounted in a supporting frame provided with arms extending parallel with, and at the sides of the belt, on which



A Pioneer 15-35 Duplex portable plant equipped with jaw and roll crushers and shaker screen.



Self-aligning, anti-friction idlers for troughed conveyor belts.

actuating rolls are mounted for the purpose of swiveling the idler frame promptly when the crooked running belt crowds sidewise enough to engage either of them. This idler frame is supported by an anti-friction pivotal bearing, carried on a cross member or sub-frame bolted to the conveyor stringers. These self-aligning idlers are used at intervals between the stationary carrying idlers of the conveyor and their operation is said not to be affected either by the speed of the belt or the load on it.

Bituminize Aggregates in Regulation Truck Mixers

The successful use of truck mixers in mixing certain bituminous materials has added utility to the investment in such units beyond their original function of mixing concrete. Standard concrete truck mixers have been used successfully on four or five jobs in Pennsylvania in mixing the standard Type B emulsion mix. The standard truck mixer may be set under a bin and charged in the usual way and a truck mixer rated as a 2-2½-cu.yd. concrete mixer will handle a 6,000 to 6,500-lb. batch of emulsion and mix it in 1 to 1½ min., producing an hourly capacity of from 40 to 45 tons.

The truck mixer is adapted not only for emulsion, but for cutback asphalt and tar mixes, particularly of a macadam grading (1½-in. to ¼-in.) but has satisfactory handled mixes utilizing an RC-3 cutback asphalt with a closer grading but the maximum under these conditions seems to be a mix where not in excess of 15 to 20 per cent. passes a No. 20 screen with not to exceed 2 or 3 per cent. through a 200-mash. Where the grading is denser than the foregoing it becomes a pugmill job but on cold patch work and retread the truck mixer can very successfully replace the pugmill as a stationary mixer or mix the materials intransit as in the case of concrete.

This added utility of the truck mixer gives opportunity for central mixing plant operators to handle cold patch or retread material with their standard equipment without added investment and many of them have been taking advantage of this feature of the standard unit.

It was found in the case of emulsion mixes that the bitumen did not build up

Regular concrete truck mixer being loaded with bituminous paving materials.

inside the mixer providing the doors were closed at night and the drum kept airtight and the unit was operated two or three weeks at a time without cleaning the interior of the drum. Ten to 15 revolutions of the drum with the emulsion mix produced a very satisfactory material and between 20,000 and 30,000 tons have been mixed in the state of Pennsylvania alone using this method. The accompanying illustration shows a Jaeger truck mixer being loaded with a bituminous mixture.

Small Shovel Is Mounted on Diesel Tractor Chassis

The Speeder Machinery Corp., Cedar Rapids, Ia., announces the new Speeder tractor shovel, which is said to be an entirely new idea in a small shovel, crane or dragline. The tractor used is the Caterpillar Diesel 40 and the shovel mechanism is manufactured and mounted on the tractor at the Speeder factory. Advantages of this unit are that it travels at the same speed and will negotiate rough ground as easily as a tractor. Features include the Speeder patented crowd for shovel operation, anti-friction bearings, simple and extra-heavy construction, and one-man operation. The shovel boom length is 14 ft. and the dipper stick 11 ft. The crane and dragline booms are 22 ft. long.

New tractor-mounted shovel which retains the advantages of a tractor.

MANUFACTURERS' PUBLICATIONS

Gasoline Tractor Crane. 12 pp. (Bull. No. 45, Silent Hoist Winch & Crane Co., Brooklyn, N. Y.) Describes and illustrates the Krane Kar and Krane Krawler made by this company.

Flexible Ball Joints. 8 p. (Catalog 205, Barco Manufacturing Co., Chicago, Ill.) Catalog illustrates various uses for the flexible ball joints made by this company.

Mixers. 7 p. (Patterson Foundry & Machine Co., East Liverpool, O.) Pamphlet describes and illustrates mixers used in the process industries.

Electrical Equipment for Power Shovels. 20 p. (General Electric Co., Chicago, Ill.) Pamphlet illustrates large and small shovels using General Electric motors.

Upright Diamond Core Drills. 6 p. (Bulletin 43, E. J. Longyear Co., Minneapolis, Minn.) Bulletin illustrates, gives specifications, and describes drills made by this company.

Centrifugal Pumps. (Worthington Pump & Machinery Corp., Harrison, N. J.) Pamphlet describes the Worthington Type U two-stage volute centrifugal pump.

Electrodes. 15 p. (Booklet No. 2, Metal & Thermit Corp., New York, N. Y.) Booklet describes and illustrates in detail electrodes and welding metals manufactured by this company.

LeTourneau Buggy. (R. G. Letourneau, Inc., Peoria, Ill.) Pamphlet illustrates the uses of the buggy and brings out some of its important features.

Pneumatic Tools. (Catalog No. 50, Independent Pneumatic Tool Co., Chicago, Ill.) In this catalog is a complete showing of pneumatic tools, manufactured under the Thor trademark, with complete specifications, etc., together with illustrations covering each type of tool.

High Temperature Cement. 7 p. (General Refractories Co., Phildadelphia, Pa.) Booklet describes the outstanding characteristics of Grefco, a dry chrome base high-temperature cement.

Tractors. 29 p. (Caterpillar Tractor Co., Peoria, Ill.) A catalog illustrating and describing a complete line of track-type tractors, blade graders, elevating graders and industrial engines.

Ball Bearings. (Sanford-Day Iron Works, Inc., Knoxville, Tenn.) Pamphlet describing the working principles of the "Floater" ball bearing.

Pneumatic Drill. 2 p. (Chicago Pneumatic Tool Co., New York, N. Y.) Pamphlet advertises a new type drill, CP-52, for heavy sinking.

Nozzles. 8 p. (Bulletin No. 50, Binks Manufacturing Co., Chicago, Ill.) Contains complete spray nozzle data and selection charts for all principal applications in the industrial field.

Trailers. 4 p. (Bulletin 10B-T1, Bucyrus-Erie Co., Milwaukee, Wis.) Describes and illustrates the new 10-B Bucyrus-Erie trailer, which was especially designed and built for carrying Bucyrus-Erie 10-B excavators.

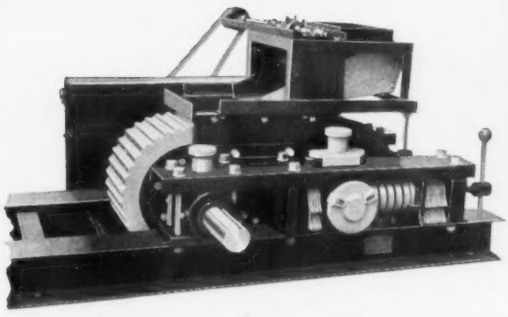
Aerial Tramways. 103 p. (American Steel & Wire Co., Chicago, Ill.) An attractive and well bound book describing and illustrating the use of wire rope on aerial tramways.

Vibrating Screens. 7 p. (Productive Equipment Corp., Chicago, Ill.) A booklet giving instructions on the care of the vibrating screens manufactured by this company.

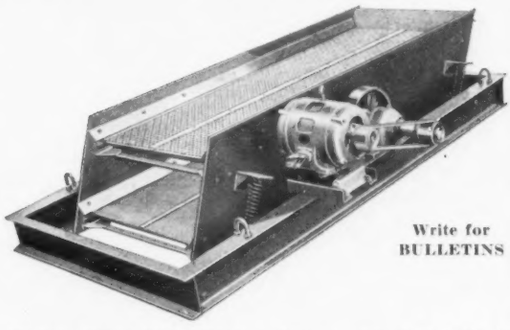
Wire Cloth. 4 p. (Newark Wire Cloth Co., Newark, N. J.) Folder illustrates wire cloth manufactured by this company.

NEW HOLLAND

CRUSHERS SCREENS



New type Roll Crushers for chips, sand, etc. Wide range of sizes and combinations for all needs.



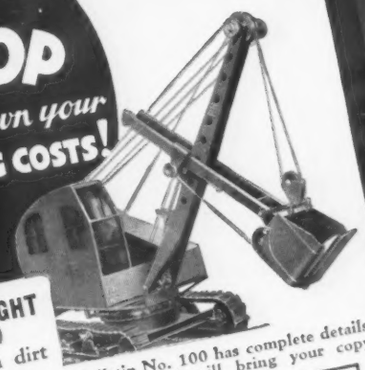
Write for BULLETINS

Modern Heavy-duty Vibrating Screens. Standard sizes in one, two and three decks. Built for all screening conditions.

NEW HOLLAND MACHINE COMPANY

P. O. Box No. 200 New Holland, Pennsylvania

THE WALLOP to knock down your DIRT MOVING COSTS!



P&H BANTAM WEIGHT
(MODEL 100 3/8 YD.)

It's not how much dirt you move that counts . . . it's *the cost of moving it!* That's where the Bantam Weight steps into the picture . . . digs its way to profits where larger machines can't.

It's full revolving and mighty husky all around. Every waste pound is trimmed off to guarantee fastest production at lowest operating costs.

Bulletin No. 100 has complete details. A post card will bring your copy.

HOW THE BANTAM WEIGHT MEASURES UP:

Capacity	⅜-yard
Engine	Ford V-8 (40 HP)
Weight (as shovel)	13,800 lbs.
Crowding Motion	P&H Rapid Reversing
Clutches	Split Second Control
Swing Clutches	Internal Expanding
Hoist Line Speed	162 F.P.M.
Dragline Speed	150 F.P.M.
Swing Speed	5 RPM
Travel Speed	1½ to 3 MPH
Tail Swing	7 Feet
Height to Top of Cab	10 Feet 4 inches

Fully Convertible at lowest cost ever for service as shovel, dragline, crane, hoe, skimmer or pile driver. Simplified design of attachments makes converting practical right on the job.

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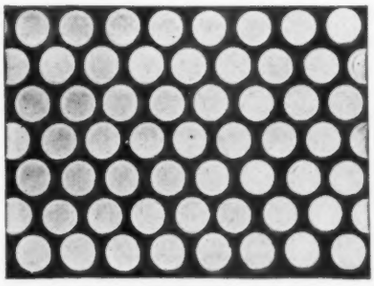
ACCURATE SCREENING

WITH

MORROW SCREEN PLATES



Write for Bulletin No. 57—the complete line of Morrow Screen Plates.

You can meet today's strict specifications in grading bulk materials by using Morrow Screen Plates in your sizing operations.

Accurately punched perforations that retain their true size and shape throughout the life of the screen insure uniform grading. And the service life of the screen is made unusually long by the superior wear resistance of Morrow metal.

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Furnished in a wide variety of sizes and perforations to meet all standard and special requirements.

THE MORROW MANUFACTURING CO., Wellston, Ohio

Classified Buyers' Guide

A Directory of PIT AND QUARRY Advertisers Arranged According to Product

Although every effort is made to insure accuracy and completeness in these listings, the publisher cannot accept responsibility for errors or omissions. Any mistakes discovered will gladly be rectified, if brought to the attention of the Advertisers' Service Department.

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Agitating Ladders (Dredge)
*Eagle Iron Works
Pettibone Mulliken Co.

Agitators, Thickeners and Slurry Mixers
*Hardinge Co.

Air Filters
Dracco Corp.

Air Separators
*Hardinge Co.
Raymond Bros. Impact Pulv. Co.

Alloys (Steel)
Ryerson & Son, Joseph T.

Anti-Freeze Solution
Firestone Tire & Rubber Co.

Ash and Refuse-Handling Equipment
*Allen-Sherman-Hoff Co.
American Manganese Steel Co.
Haiss Mfg. Co., Geo.
Hetherington & Berner, Inc.
*Link-Belt Co.
*Robins Conveying Belt Co.
Stephens-Adamson Mfg. Co.

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*Hardinge Co.
*Link-Belt Co.
Stephens-Adamson Mfg. Co.

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Ryerson & Son, Joseph T.

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*Harnischfeger Corp.
*Lima Locomotive Works, Inc.

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*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

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*Allis-Chalmers Mfg. Co.
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

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Firestone Tire & Rubber Co.

Bearings (Anti-Friction)
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Haiss Mfg. Co., Geo.
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Morrow Mfg. Co.
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Bins (Steel)
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*Hendrick Mfg. Co.
Hetherington & Berner, Inc.
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*Kennedy-Van Saun Mfg. and Eng. Corp.
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McLanahan and Stone Corp.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.
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Blasting Supplies
Du Pont de Nemours & Co.
*Ensign-Bickford Co.

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American Manganese Steel Co.
Haiss Mfg. Co., Geo.
*Sauerman Bros., Inc.
Sprout, Waldron & Co.

Bodies (Motor Truck, Concrete Mixing)
Jaeger Machine Co.

Boots (Rubber)
Goodyear Tire & Rubber Co.
United States Rubber Co.

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Pennsylvania Drilling Co.

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Firestone Tire & Rubber Co.

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*Harnischfeger Corp.
*Link-Belt Co.
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Wellman Engr. Co.

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*Link-Belt Co.
*Sauerman Bros., Inc.
Wellman Engr. Co.

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*Hendrick Mfg. Co.
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*Robins Conveying Belt Co.
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Cableways
*American Steel & Wire Co.
*Link-Belt Co.
*Roebling's Sons Co., John A.
*Sauerman Bros., Inc.

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Du Pont de Nemours & Co.

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*Link-Belt Co.
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Car Pullers
*Link-Belt Co.
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*Austin-Western Road Machy. Co.
Stephens-Adamson Mfg. Co.

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*Link-Belt Co.
Lippmann Engr. Works
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

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*Eagle Iron Works
*Hardinge Co.
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*Link-Belt Co.
McLanahan and Stone Corp.
Pettibone Mulliken Co.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

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Chain (Dredge and Shovel)
Ryerson & Son, Joseph T.

Chain Drives
*Link-Belt Co.
Stephens-Adamson Mfg. Co.

Chain (Elevating and Conveying)
American Manganese Steel Co.
Haiss Mfg. Co., Geo.
*Link-Belt Co.
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Chutes and Chute Liners
American Manganese Steel Co.
Goodyear Tire & Rubber Co.
Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
Iowa Mfg. Co.
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Lippmann Engr. Works
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Morrow Mfg. Co.
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Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Classifiers
*Deister Machine Co.
*Hardinge Co.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machine Co.
*Link-Belt Co.
Lippmann Engr. Works
Stephens-Adamson Mfg. Co.

Clips (Wire Rope)
*American Steel & Wire Co.
*Roebling's Sons Co., John A.

Clutches
*Link-Belt Co.
Sprout, Waldron & Co.

Coal-Pulverizing Equipment
*Allis-Chalmers Mfg. Co.
Bonnot Co.
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Raymond Bros. Impact Pulv. Co.

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Concentrators (Slurry)
*Deister Concentrator Co.

Concrete Mixers
Jaeger Machine Co.
Koehring Co.

Concrete Slab Raising Equipment (Mud-Jacks)
Koehring Co.

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*Link-Belt Co.
Smith Engr. Works

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*Link-Belt Co.
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*Robins Conveying Belt Co.
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Conveyors and Elevators
*Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
Dracco Corp.
Haiss Mfg. Co., Geo.
*Hendrick Mfg. Co.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Link-Belt Co.
Lippmann Engr. Works
McLanahan and Stone Corp.
Morrow Mfg. Co.
New Holland Machine Co.
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Conveyors (Pneumatic)
Dracco Corp.

Conveyors (Ready-Mixed Concrete)
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Jaeger Machine Co.
*Link-Belt Co.
*Robins Conveying Belt Co.

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*Link-Belt Co.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Cranes (Crawler and Locomotive)
*Austin-Western Road Machy. Co.
*Harnischfeger Corp.
Koehring Co.
*Lima Locomotive Works, Inc.
*Link-Belt Co.

Cranes (Overhead)
*Harnischfeger Corp.

Crusher Parts
American Manganese Steel Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
McLanahan and Stone Corp.
Pettibone Mulliken Co.

Crushers (Cone)
Nordberg Mfg. Co.

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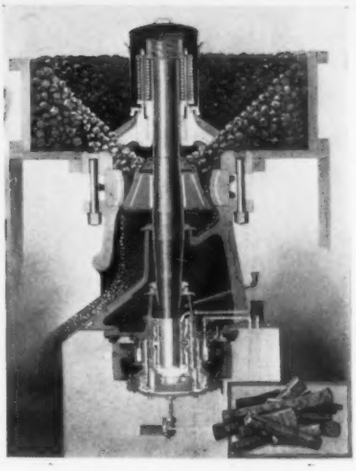
*Allis-Chalmers Mfg. Co.
*Austin-Western Road Machy. Co.
Bonnot Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Crushers (Jaw and Gyratory)
*Allis-Chalmers Mfg. Co.
*Austin-Western Road Machy. Co.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
Lippmann Engr. Works
New Holland Machine Co.
Nordberg Mfg. Co.
Smith Engr. Works

Crushers (Roll)
*Allis-Chalmers Mfg. Co.
*Austin-Western Road Machy. Co.
Bonnot Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
Lippmann Engr. Works
McLanahan and Stone Corp.
New Holland Machine Co.
*Robins Conveying Belt Co.

Crushers (Rotary)
*Allis-Chalmers Mfg. Co.
*Austin-Western Road Machy. Co.
Bonnot Co.
New Holland Machine Co.

*** See also information in the 1935 Pit and Quarry HANDBOOK.**



GREATER TONNAGE with HALF THE POWER COST *Guaranteed!*

THE Kennedy Ball Bearing Gearless Gyratory Crusher is guaranteed to produce a greater tonnage than any other crusher of a given size, with half the power per ton of ore. This crusher can be equipped with a synchronous motor in its pulley, or driven by flat or V-belt from a standard motor.

The Savings Effected with this crusher are astounding:

In cost of Maintenance.....80%
In Power.....The entire cost of crusher and motor in pulley is amortized annually.

Sieving test on glacial gravel crushed at the rate of 18 tons per hour, with No. 19 crusher set to ⅛ in., and using less than 15 hp., follows:

Minus ⅜ in.	100%
Plus 3 mesh	21½%
Minus 3—Plus 4	17%
Minus 4—Plus 14	36½%
Minus 14—Plus 48	15%
Minus 48—Plus 100	4%
Minus 100	5½%

KENNEDY VIBRATING SCREEN

Built in open or enclosed types, in widths ranging from 3′ to 6′ with one or more decks. It can be suspended, or supported from the bottom.

Suitable for scalping oversize from primary crushers, as well as smaller sizes, and chemical products.

The entire screening surface is effective, thereby insuring greatest capacity.

Equipped with self-aligning main bearings which account for low power consumption and also for long life of bearings.

Screen drive shaft is positioned near the feed end for balancing purposes and is patented.

Write today for our Catalog No. 16-P-635

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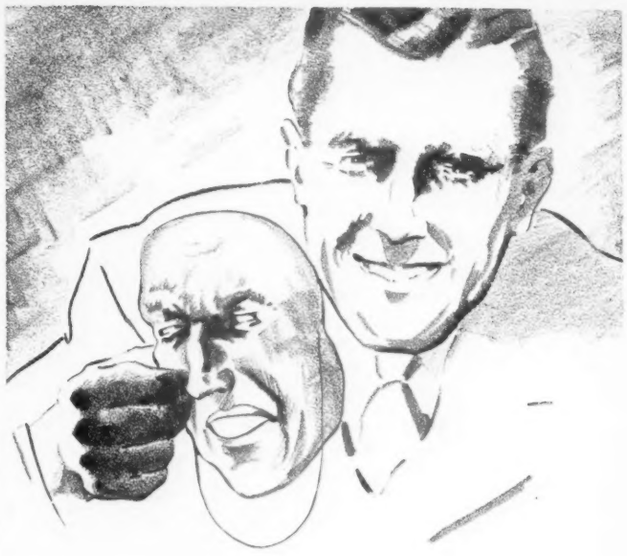
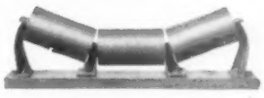


The TOUGH CUSTOMER *is a blessing in disguise*



EQUIPMENT ITEMS

Conveyor Idlers
Screens
Robins Oro Manganese Feeders
Belting
Bucket Elevators
Bin Gates

SCREENS from the smallest to the largest.

MATERIAL HANDLING ROBINS EQUIPMENT

About every customer is tough today . . . and why shouldn't he be? . . . prices are under code so naturally he is most exacting as to cleanness and uniformity of product. Yes, he is a blessing to you, for he makes you consider equipment that will give him what he demands and that same equipment enables you to produce at lower cost, use less power per ton and minimize maintenance. In considering modernizing your plant, you will do well to avail yourself of the consulting service Robins offers. It entails no obligation to buy.

Robins Conveying Belt Co.
15 Park Row, New York City

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Name.....

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Town.....State.....

Classified Buyers' Guide

A Directory of PIT AND QUARRY Advertisers Arranged According to Product

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Crushing Rolls
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Austin-Western Road Machy. Co.
Bonnot Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
Lippmann Engr. Works
McLanahan and Stone Corp.
New Holland Machine Co.

Detonators
Du Pont de Nemours & Co.

Diesel Engines (See Engines—Diesel)

Dipper Parts
Pettibone Mulliken Co.

Dippers and Teeth (Power Shovel)
American Manganese Steel Co.
Koehring Co.
Pettibone Mulliken Co.

Doors (Iron)
Smith Wire & Iron Works, F. P.

Dragline Cableway Excavators
*Link-Belt Co.

Dragline Excavators
*Austin-Western Road Machy. Co.
*Harnischfeger Corp.
Koehring Co.
*Lima Locomotive Works, Inc.
*Link-Belt Co.

Dredges
Hetherington & Berner, Inc.
*Morris Machine Works

Drilling Contractors
Hoffman Bros. Drilling Co.
Mott Core Drilling Co.
Pennsylvania Drilling Co.

Drills (Core)
Hoffman Bros. Drilling Co.
Mott Core Drilling Co.
Pennsylvania Drilling Co.

Drills (Diamond)
Hoffman Bros. Drilling Co.
Mott Core Drilling Co.
Pennsylvania Drilling Co.

Drills (Well) (See Drills—Blast-Hole)

Drives (Multiple, Belt, Chain, Rope)
*Allis-Chalmers Mfg. Co.

Dryers
*Allis-Chalmers Mfg. Co.
Bonnot Co.
*Hardinge Co.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Fdry. & Mch. Co.
McLanahan and Stone Corp.

Dust Arresters
Dracco Corp.

Dust-Collecting Systems
*Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
Dracco Corp.
Raymond Bros. Impact Pulv. Co.

Dust Conveying Systems
*Allen-Sherman-Hoff Co.
Dracco Corp.

Dust Handling Systems (Hydro Vacuum)
*Allen-Sherman-Hoff Co.

Dynamite (See Explosives)

Electrical Equipment
*Allis-Chalmers Mfg. Co.

Elevator Belting (See Belting)

Elevators (See Conveyors and Elevators)

Eliminators (Soft Stone) (See Soft Stone Eliminators)

Engineers
*Allis-Chalmers Mfg. Co.
Bonnot Co.
Hetherington & Berner, Inc.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lippmann Engr. Works
McLanahan and Stone Corp.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Engine Generator Sets
See Generator Sets (Engine).

Engines (Diesel)
Cummins Engine Co.
Nordberg Mfg. Co.

Engines (Internal-Combustion)
Cummins Engine Co.
Nordberg Mfg. Co.

Engines (Steam)
*Morris Machine Works
Nordberg Mfg. Co.

Excavating Machinery (See Shovels; Cranes; Buckets; etc.)

Excavators—Shallow Grading (Bucket Elevator Type)
Haiss Mfg. Co., Geo.

Explosives
Du Pont de Nemours & Co.

Fans (Exhaust)
*Kennedy-Van Saun Mfg. and Eng. Corp.

Feeders
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Bonnot Co.
*Hardinge Co.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
*Link-Belt Co.
Lippmann Engr. Works
Morrow Mfg. Co.
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Fencing (Woven Wire)
*American Steel & Wire Co.
Smith Wire & Iron Works, F. P.

Fire Escapes
Smith Wire & Iron Works, F. P.

Floor Sweeping Systems (Hydro Vacuum)
*Allen-Sherman-Hoff Co.

Fuses (Detonating)
Du Pont de Nemours & Co.
*Ensign-Bickford Co.

Gaskets
Goodyear Tire & Rubber Co.
Republic Rubber Co.

Gasoline Engines (See Engines—Internal-Combustion)

Gas Producers
Wellman Engr. Co.

Gates (Bin) (See Bin Gates)

Gates (Clamshell)
Haiss Mfg. Co., Geo.
*Link-Belt Co.

Gears (Herringbone)
*Link-Belt Co.
Sprout, Waldron & Co.

Gears and Pinions
Haiss Mfg. Co., Geo.
*Link-Belt Co.
Pettibone Mulliken Co.
Sprout, Waldron & Co.

Gelatin (See Explosives)

Generators (See Motors and Generators)

Glass Sand Equipment
Lewistown Foundry & Machine Co.

Goggle Parts
Goggle Parts Co.

Goggles
Goggle Parts Co.

Grab Buckets (See Buckets—Clamshell, Orange - Peel, etc.)

Grating (Steel)
*Hendrick Mfg. Co.
Ryerson & Son, Joseph T.

Grinding Balls (See Balls, Grinding)

Grizzlies
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Eagle Iron Works
*Hendrick Mfg. Co.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Fdy. & Mach. Co.
Lippmann Engr. Works
Pettibone Mulliken Co.
*Robins Conveying Belt Co.
Smith Engr. Works
Stephens-Adamson Mfg. Co.

Guards (Machine)
Goggle Parts Co.

Guards (Wire)
Smith Wire & Iron Works, F. P.

Guns (Hydraulic)
Hetherington & Berner, Inc.
Taylor Forge & Pipe Works

Hammer Mills (See Crushers—Hammer)

Hoists
*Harnischfeger Corp.
Hetherington & Berner, Inc.
Iowa Mfg. Co.
*Link-Belt Co.
McLanahan and Stone Corp.
*Sauerman Bros., Inc.
Smith Engr. Works
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Hoppers
*Hendrick Mfg. Co.
*Link-Belt Co.
Lippmann Engr. Works

Hose (Air, Steam and Water)
Goodyear Tire & Rubber Co.
Republic Rubber Co.
United States Rubber Co.

Hose (Radiator-Engine Cooling)
Firestone Tire & Rubber Co.
Goodyear Tire & Rubber Co.
Republic Rubber Co.
United States Rubber Co.

Hose Couplings (See Couplings)

Hydraulic Guns (See Guns—Hydraulic)

Idlers
American Manganese Steel Co.
*Link-Belt Co.
Lippmann Engr. Works
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Kilns and Coolers (Rotary)
*Allis-Chalmers Mfg. Co.
Bonnot Co.
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Kilns (Vertical)
*Hardinge Co.

Lenses (Goggle)
Goggle Parts Co.

Lime-Handling Equipment
*Hardinge Co.
Iowa Mfg. Co.
*Link-Belt Co.
Raymond Bros. Impact Pulv. Co.
*Robins Conveying Belt Co.
Stephens-Adamson Mfg. Co.

Lime and Hydrating Plants
*Hardinge Co.

Lime Kilns
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Linings (Ball- and Tube-Mill) (See Mill Liners and Linings)

Loaders and Unloaders
Haiss Mfg. Co., Geo.
*Link-Belt Co.
Lippmann Engr. Works
*Robins Conveying Belt Co.
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Locomotives (Electric, Gas and Steam)
*Lima Locomotive Works

Magnetic Pulleys (See Pulleys, Magnetic)

Manganese Steel
American Manganese Steel Co.
Pettibone Mulliken Co.
Ryerson & Son, Joseph T.

Manganese Steel (Plates and Sheets)
American Manganese Steel Co.
Pettibone Mulliken Co.
Ryerson & Son, Joseph T.

Mechanical Rubber Goods
Firestone Tire & Rubber Co.
Goodyear Tire & Rubber Co.
Republic Rubber Co.
United States Rubber Co.

Mill Liners and Linings
American Manganese Steel Co.
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Mills (Grinding) (See also Crushers—Hammer)
*Allis-Chalmers Mfg. Co.
Bonnot Co.
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Fdy. & Mch. Co.
Lippmann Engr. Works
Raymond Bros. Impact Pulv. Co.
Sprout, Waldron & Co.

Motors and Generators
*Allis-Chalmers Mfg. Co.
*Harnischfeger Corp.

Motors (Internal-Combustion) (See Engines — Internal-Combustion)

Nails
*American Steel & Wire Co.
Ryerson & Son, Joseph T.

Netting (Locomotive Stack)
Smith Wire & Iron Works, F. P.

Nozzles (Gravel Washing)
*Deister Concentrator Co.

Nozzles (Hydraulic) (See Guns—Hydraulic)

Nozzles (Spray)
*Deister Concentrator Co.

Nuts
Automatic Nut Co.

Packings
Goodyear Tire and Rubber Co.
Republic Rubber Co.

Partitions (Wire)
Smith Wire & Iron Works, F. P.

Paving Mixers
Jaeger Machine Co.
Koehring Co.

Pawls
Stephens-Adamson Mfg. Co.

Perforated Metal Plates
*Allis-Chalmers Mfg. Co.
Chicago Perforating Co.
*Hendrick Mfg. Co.
Morrow Mfg. Co.
Ryerson & Son, Joseph T.
Sprout, Waldron & Co.

Pipe, Dredge (Floating and Shore)
Taylor Forge & Pipe Works

Pipe Flanges
Hetherington & Berner, Inc.
Ryerson & Son, Joseph T.
Taylor Forge & Pipe Works

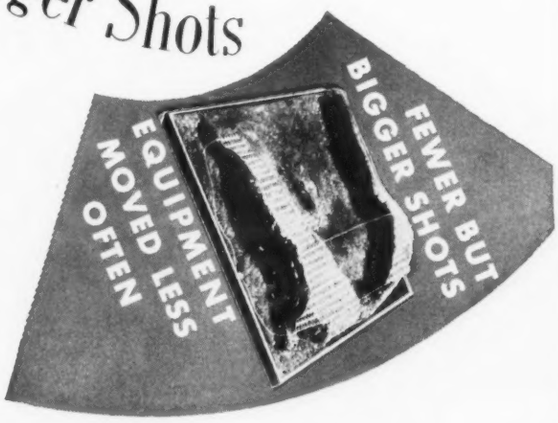
Plug Valves (See Valves)

Pneumatic Drills (See Drills, Rock)

Portable Conveyors
Haiss Mfg. Co., Geo.
Iowa Mfg. Co.
*Link-Belt Co.
Lippmann Engr. Works
*Robins Conveying Belt Co.
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

*** See also information in the 1935 Pit and Quarry HANDBOOK.**

YES WE MEAN IT.. Fewer but Bigger Shots



Manistique made history in 1935 with a giant blast comprising more than 4,000 six-inch holes. Cordeau-Bickford was the detonating agent. It carried a powerful detonating wave to every cartridge in each load. It also provided a *positive* hook-up for all holes in a planned rotation that resulted in successive relief of burden—and better fragmentation.

Bigger shots also save money in time, in labor, and in wear and tear on machinery and equipment. With shots planned to include groups of holes, drilling can proceed without the frequent interruptions that accompany small blasts. Equipment can remain on the scene until all holes are drilled, instead of being repeatedly removed or covered to make way for smaller shots.

Yet bigger blasts—fewer, more economical and more profitable blasts—are only one way in which Cordeau-Bickford saves money. Learn about its other cost-saving features. The Ensign-Bickford Company, Simsbury, Conn. *Estab. 1836.*

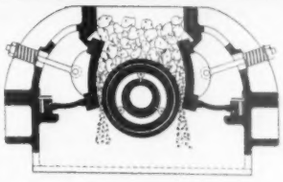
CORDEAU
DETONATING FUSE
BICKFORD
ALSO SAFETY FUSE *Since* 1836

The ENSIGN-BICKFORD COMPANY
CB-43

BONNOT FOR PROFIT

CONTINUOUS improvements in design and construction over a period of years have brought Bonnot equipment to a high degree of efficiency. The substantially lower costs of production, longer service life and lower maintenance expense, which you obtain from the use of Bonnot reduction machinery, assure larger profits for you in producing crushed or pulverized materials. Note the distinctive features in each of the following types of equipment.

REDUCTION CRUSHERS

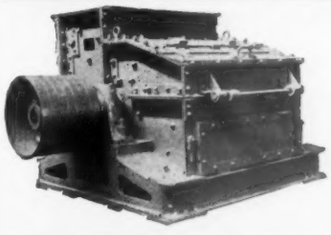


An entirely new principle of crushing, which includes the SLOW CREEP MANTLE for even distribution of wear over the crushing surfaces. Simple, rugged, and economical in power.

PULVERIZERS, ROLL TYPE

For grinding a great variety of crushed materials, including hydrated lime, quicklime, limestone, coal, clay, phosphate rock, barytes and similar products. Wearing parts few in number and easily replaced. Built in two sizes with 18 and 36-inch diameter rings.

HAMMER CRUSHERS



Swing-hammer type for high speed operation. Oversize bearings with shafts of specially heat treated steel. Breaker plate readily adjustable and faced with manganese steel. Hammers of special alloy steels, proven superior for long, continuous service.

ROTARY KILNS

Also Rotary Dryers, Dry Pans, Coolers, Tube Mills, Ball Mills and auxiliary equipment. Write for Bulletin of machines in which you are interested.

THE BONNOT CO.
CANTON *Since 1891* **OHIO**

Classified Buyers' Guide

A Directory of PIT AND QUARRY Advertisers Arranged According to Product

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Portable Crushing and Screening Plants
*Austin-Western Road Machy. Co.
Iowa Mfg. Co.
Lippmann Engr. Works
Stephens-Adamson Mfg. Co.

Portable Engines (See Engines —Internal Combustion)

Portable Loaders (See Loaders and Unloaders)

Power Cables (Rubber Clad)
*American Steel & Wire Co.

Power Shovels (See Shovels, Electric, Internal-Combustion and Steam)

Pulleys (Magnetic)
Sprout, Waldron & Co.

Pulleys (Wing)
Sprout, Waldron & Co.

Pulverized Fuel Systems
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Raymond Bros. Impact Pulv. Co.

Pulverizers (See also Crushers; Mills; etc.)
*Austin-Western Road Machy. Co.
Bonnot Co.
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
Lippmann Engr. Works
New Holland Machine Co.
Raymond Bros. Impact Pulv. Co.

Pump Valves (See Valves Pump)

Pumps (Cement Slurry)
*Allen-Sherman-Hoff Co.
*Morris Machine Works

Pumps (Centrifugal)
*Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Hetherington & Berner, Inc.
*Morris Machine Works
Pettibone Mulliken Co.

Pumps (Dredging)
*Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Hetherington & Berner, Inc.
*Morris Machine Works
Pettibone Mulliken Co.

Pumps (Sand and Gravel)
*Allen-Sherman-Hoff Co.
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Hetherington & Berner, Inc.
*Morris Machine Works
Pettibone Mulliken Co.

Ready-Mixed Concrete Plants
Stephens-Adamson Mfg. Co.

Respirators
Goggle Parts Co.

Respirator Parts
Goggle Parts Co.

Rims (Wheel)
Firestone Tire & Rubber Co.

Rock Drills (See Drills—Rock)

Rod Mills
*Hardinge Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.

Rods (Welding)
American Manganese Steel Co.
McLean Welded Products Corp.
Ryerson & Son, Joseph T.

Roofing and Siding (Steel)
Ryerson & Son, Joseph T.

Rope (Wire) (See Wire Rope)

Safety Appliances
Pulmosan Safety Equip. Corp.

Safety Equipment
Goggle Parts Co.

Sand Separators
*Link-Belt Co.
McLanahan and Stone Corp.
Smith Engr. Works
Stephens-Adamson Mfg. Co.

Sand—Lime—Brick Machinery
*Hardinge Co.

Sand-Settling Tanks
Iowa Mfg. Co.
*Link-Belt Co.
Smith Engr. Works
Stephens-Adamson Mfg. Co.

Scrapers (Power Drag)
*Austin-Western Road Machy. Co.
Iowa Mfg. Co.
*Link-Belt Co.
*Sauerman Bros., Inc.

Screens
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
Chicago Perforating Co.
Cleveland Wire Cloth & Mfg. Co.
*Deister Concentrator Co.
*Deister Machine Co.
*Eagle Iron Works
Haiss Mfg. Co., Geo.
*Hardinge Co.
*Hendrick Mfg. Co.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Link-Belt Co.
Lippmann Engr. Works
McLanahan and Stone Corp.
Morrow Mfg. Co.
Nordberg Mfg. Co.
*Productive Equip. Corp.
*Robins Conveying Belt Co.
*Roebling's Sons Co., John A.
Smith Engr. Works
Smith Wire & Iron Works, F. P.
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Screens (Vibrating or Shaking)
*Allis-Chalmers Mfg. Co.
*Austin-Western Road Machy. Co.
*Deister Concentrator Co.
*Deister Machine Co.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Link-Belt Co.
Lippmann Engr. Works
McLanahan and Stone Corp.
New Holland Machine Co.
Nordberg Mfg. Co.
*Productive Equip. Corp.
*Robins Conveying Belt Co.
Smith Engr. Works
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Separators (Air) (See Air Separators)

Sheaves
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Eagle Iron Works
Haiss Mfg. Co., Geo.
Hetherington & Berner, Inc.
*Link-Belt Co.
McLanahan and Stone Corp.
Pettibone Mulliken Co.
Sprout, Waldron & Co.

Shovels (Electric, Internal Combustion and Steam)
*Austin-Western Road Machy. Co.
*Harnischfeger Corp.
Koehring Co.
*Lima Locomotive Works, Inc.
*Link-Belt Co.

Skip Hoists and Skips
*Allis-Chalmers Mfg. Co.
Hetherington & Berner, Inc.
*Link-Belt Co.
*Robins Conveying Belt Co.
Stephens-Adamson Mfg. Co.

Spark Plugs
Firestone Tire & Rubber Co.

Speed Reduction Units
Iowa Mfg. Co.
*Link-Belt Co.
Stephens-Adamson Mfg. Co.

Spouts (See Chutes and Chute Liners)

Sprays
*Deister Concentrator Co.

Sprockets and Chain
American Manganese Steel Co.
Iowa Mfg. Co.
*Link-Belt Co.
Pettibone Mulliken Co.
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Stairs (Iron)
Smith Wire & Iron Works, F. P.

Stairs (Mine)
Smith Wire & Iron Works, F. P.

Steel (Alloy)
(See Alloys—Steel)

Steel (Abrasion Resisting)
Ryerson & Son, Joseph T.

Steel (Bars, Shapes, Plates, etc.)
Ryerson & Son, Joseph T.

Steel Grating (See Grating, Steel)

Steel Inclines (See Inclines, Steel)

Steel Plate Construction
*Hendrick Mfg. Co.
Hetherington & Berner, Inc.
Sprout, Waldron & Co.

Storage Equipment
Haiss Mfg. Co., Geo.
*Link-Belt Co.
*Sauerman Bros., Inc.
Stephens-Adamson Mfg. Co.

Sweatbands
Goggle Parts Co.

Sweeping Systems
*Allen-Sherman-Hoff Co.

Tanks
*Hendrick Mfg. Co.
*Link-Belt Co.

Tanks (Sand-Settling)
Iowa Mfg. Co.
*Link-Belt Co.
Morrow Mfg. Co.
Smith Engr. Works
Stephens-Adamson Mfg. Co.

Testing Sieves and Shakers
*Hendrick Mfg. Co.

Thickeners (Slurry)
*Hardinge Co.

Tire Repair Materials
Firestone Tire & Rubber Co.
Goodyear Tire & Rubber Co.
United States Rubber Co.

Tires (Truck, Passenger Cars, Tractor)
Firestone Tire & Rubber Co.
Goodyear Tire & Rubber Co.
United States Rubber Co.

Tools (Drill) (See Drilling Accessories)

Track Equipment
Pettibone Mulliken Co.

Track Shifters
Nordberg Mfg. Co.

Tractors
*Allis-Chalmers Mfg. Co.

Tramways (Aerial)
*American Steel & Wire Co
*Roebling's Sons Co., John A.

Transformers
*Allis-Chalmers Mfg. Co.

Transmission Belting (See Belting)

Transmission Machinery
*Allis-Chalmers Mfg. Co.
American Manganese Steel Co.
*Link-Belt Co.
Stephens-Adamson Mfg. Co.

Trippers
*Link-Belt Co.
*Robins Conveying Belt Co.
Stephens-Adamson Mfg. Co.

Truck Cranes (See Cranes)

Truck Mixers
Jaeger Machine Co.

Trucks and Trailers (See Motor Trucks)

Tube-Mills (See Mills—Ball, Tube, etc.)

Tubes (For Tire Casing)
Firestone Tire & Rubber Co.
Goodyear Tire & Rubber Co.
United States Rubber Co.

Underground Loaders
*Allis-Chalmers Mfg. Co.

Unloaders (Box Car)
*Link-Belt Co.
Lippmann Engr. Works
Stephens-Adamson Mfg. Co.

Variable Speed Reducers or Transmissions
*Link-Belt Co.
Stephens-Adamson Mfg. Co.

Valves (Pump)
Taylor Forge & Pipe Works

Vibrating Screen Plate
Chicago Perforating Co.
*Hendrick Mfg. Co.
*Link-Belt Co.
Morrow Mfg. Co.

Vibrating Screens (See Screens —Vibrating)

Wagons (Dump)
*Austin-Western Road Machy. Co.
Koehring Co.

Washers (Sand, Gravel and Stone)
*Allis-Chalmers Mfg. Co.
*Eagle Iron Works
Haiss Mfg. Co., Geo.
*Hardinge Co.
Iowa Mfg. Co.
*Kennedy-Van Saun Mfg. and Eng. Corp.
Lewistown Foundry & Machinery Co.
*Link-Belt Co.
Lippmann Engr. Works
McLanahan and Stone Corp.
Smith Engr. Works
Stephens-Adamson Mfg. Co.

Welding & Cutting Equipment
McLean Welded Products Corp.
Ryerson & Son, Joseph T.

Welding Helmets and Shields
Goggle Parts Co.

Welding Supplies
American Manganese Steel Co.
*American Steel & Wire Co.
McLean Welded Products Corp.
*Roebling's Sons Co., John A.
Ryerson & Son, Joseph T.

Well Drills (See Drills—Well)

Wheels (Car)
American Manganese Steel Co.
*Eagle Iron Works
Iowa Mfg. Co.
Pettibone Mulliken Co.

Wheel Rims. See Rims—Wheel

Winches and Capstans
*Link-Belt Co.
*Robins Conveying Belt Co.
Sprout, Waldron & Co.
Stephens-Adamson Mfg. Co.

Wire & Cable (Electric)
*American Steel & Wire Co.
*Roebling's Sons Co., John A.

Wire Cloth
Cleveland Wire Cloth & Mfg. Co.
*Robins Conveying Belt Co.
*Roebling's Sons Co., John A.
Smith Wire & Iron Works, F. P.

Wire Rope
*American Steel & Wire Co.
*Roebling's Sons Co., John A.
Ryerson & Son, Joseph T.
Williamsport Wire Rope Co.

Wire Rope Fittings
*American Steel & Wire Co.
*Roebling's Sons Co., John A.
Ryerson & Son, Joseph T.
Williamsport Wire Rope Co.

Wire Rope Slings
*American Steel & Wire Co.
*Roebling's Sons Co., John A.
Williamsport Wire Rope Co.

Wire (Welding)
*American Steel & Wire Co.
McLean Welded Products Corp.
*Roebling's Sons Co., John A.
Ryerson & Son, Joseph T.

Worm Gears (See Gears and Pinions)

*** See also information in the 1935 Pit and Quarry HANDBOOK.**

Saved Costly Shutdowns

It would have cost many hundreds of dollars to replace the worn parts of this huge No. 24 gyratory crusher, besides the cost of the necessary shutdown—but McLean rebuilt the crusher head with **work-hardened** nickel-manganese steel at a fraction of that cost and gave the owners a surface that will outlast the original several times over.

This job was done right in the field, eliminating the expense of rehandling, and preventing a long and costly interruption of the crushing work. For the crusher worked all day and the welders all night; that is the McLean method in installations of this kind. No less than 1200 pounds of welding material was used on this job alone.

McLean offers you this economical service in rebuilding your worn-out castings, such as dipper teeth, crusher heads and gears, pulverizer hammers, etc. Ship them to us, or we'll come to you—whichever is convenient for you.

The extra wear-life you get from castings rebuilt by the McLean process is due to the method of *work-hardening* the built-up portion before applying the hard surfacing, which insures a tough base metal that will not crack or chip.

Send for Bulletin—and ask about our special offer on rebuilding dipper teeth at less cost, including freight, than a set of new ones.

McLean Welded Products Corp.

WELDING ENGINEERS AND CONTRACTORS

530-32 WEST 79th STREET, CHICAGO, ILLINOIS

1000 JERKS PER MIN

A battery of Robins Gyrex Screens "ready to go"—and *keep going* with ANCO NUTS

can't shake 'em loose

ANCO NUTS are the standard self-locking fasteners for Robins Screens. Note how they are applied to the main bearing connection to provide a positive, permanent grip that resists constant vibration and shock. This is a severe test, because the powerful stroke and high speed vibration of Robins Gyrex Screens put a heavy strain on the nuts.

Use Anco Nuts in all your important equipment—save in assembly and avoid uncertainty. They automatically lock themselves, and stay locked, until unlocked with an ordinary wrench. Easy to install, and can be used repeatedly without destroying bolt or nut. Let us send you samples for test—just tell us the size wanted and whether standard thread, U.S.S. or S.A.E.

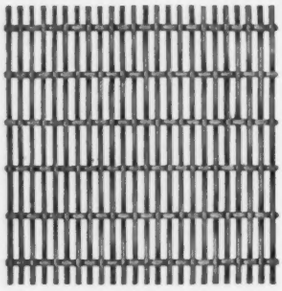
ANCO NUTS

AUTOMATIC NUT COMPANY

Chrysler Bldg. New York City

ANCO NUTS

FOR USE WHEREVER A GOOD NUT IS REQUIRED, SCREENS, CONVEYORS, CLAM SHELL BUCKETS, CRUSHERS, ETC.



Rolled Slot

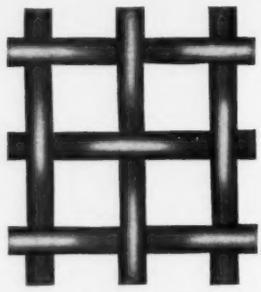
ALLOY No. 2

A super wearing Steel developed to resist the abrasion and vibration of modern screening demands.

"CLEVELAND" SCREENS

A wire cloth of guaranteed accuracy backed by fine workmanship and an effort to satisfy.

Available in Square Mesh and Rolled Slot. A trial will convince you of the superiority.

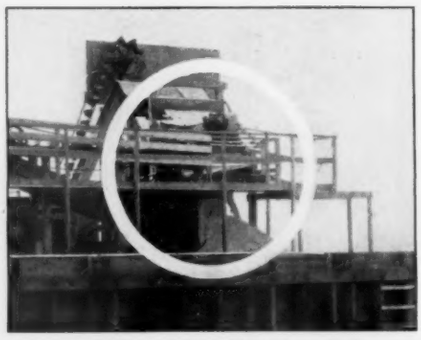


2 Mesh .162 Ga.

THE CLEVELAND WIRE CLOTH & MFG. COMPANY
3574 E. 78th St. CLEVELAND, OHIO

SCREENS—*GUARANTEED SERVICE*

LEAHY



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If you are just a small user of safety goggles this idea may be worth $100 or more to you. For a railroad company it proved to be a $1000 + plus idea. In one year this company cut goggle expenses more than $15,000. Enjoyed better goggle service. Inspired workmen to treat goggles with more respect. To operating men seeking lower production costs—to safety and personnel executives striving for improved safety records, this plan offers ideas of practical value. Full details outlined in our new bulletin—copy of which will be sent on request. Write for yours today.

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Headquarters for Replacement Parts

Lenses for Chipping, Dust & Welding • Goggles • Headbands
Sweatbands • Welding Helmets • Grinding Wheel • Guards
Respirator Filters • Accessories

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Less cable overhaul and super-digging power of Williams "Champion" Buckets are features that save crane time and add to your profit per job.

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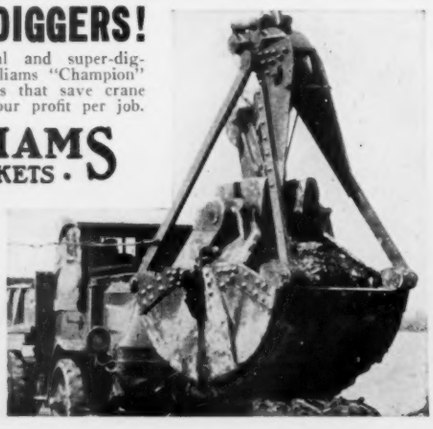
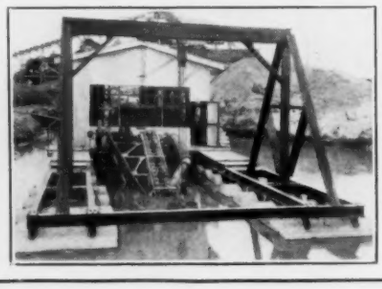


EAGLE SWINTEK SCREEN NOZZLE LADDER LOWER YOUR COST



Will eliminate stoppages and slug pumping—insuring an even, constant feed of solids to the suction nozzle—with less power—greatly decreasing the cost per yard of material produced.

Write for descriptive literature and let us tell you how this can be done with your dredge.

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Des Moines, Iowa

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PERFORATED METALS

are popular in the quarry fields. They wear well. Full range of sizes

Heat-Treated
Double-Corrugated Plates

with square, round and "Sqround" perforations. Write for data, particularly on the new "Sqround" Mesh.

Investigate the Weston Testing Screen for making sizing tests.

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Advertise your wants and surplus equipment in

Pit and Quarry
with which is consolidated
CEMENT-MILL & QUARRY

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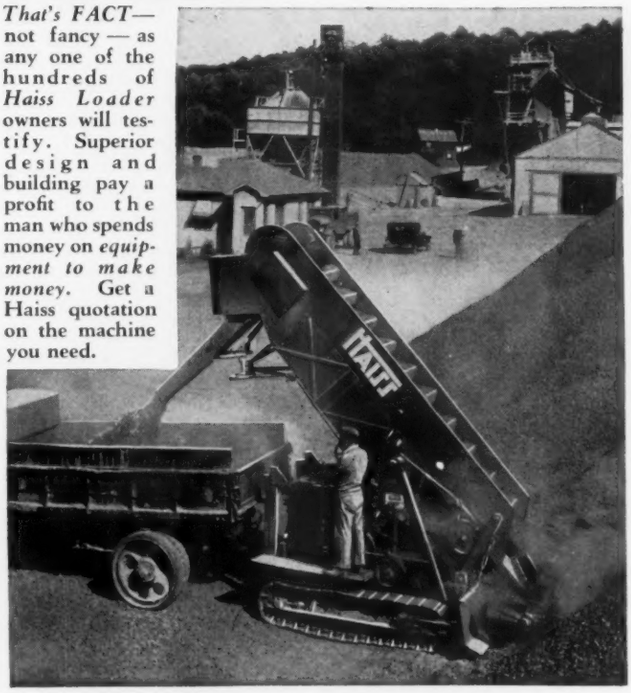
—for profit and satisfaction

That's FACT—not fancy — as any one of the hundreds of *Haiss Loader* owners will testify. Superior design and building pay a profit to the man who spends money on *equipment to make money*. Get a Haiss quotation on the machine you need.



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Builders also of HAISS ELEVATORS—SCREENS—CLAMSHELL BUCKETS

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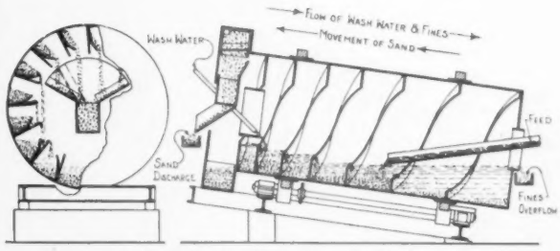
CLASSIFIER
SEPARATOR
DISSOLVER
WASHER

All in One Machine



Principle of Operation of Machine

The Hardinge Counter Current Classifier—using no internal moving parts—is the only machine that can accomplish the above results.

It turns over the entire load from 3 to 5 times per revolution freeing all particles and washing—or dissolving them, with fresh solution flowing counter to the movement of the solids.

Washed, dissolved or classified solids are kept apart from partially treated solids by virtue of the "dam" effect of the spiral attached to and *revolving with* the drum as one unit. What is your problem?

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INCORPORATED
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CENTRIFUGAL PUMPS • DREDGES • STEAM ENGINES

For abrasive mixtures, corrosive liquids, or clear water. Any capacity, head, or method of drive.

For sand and gravel production, water supply reservoirs, filling in, or waterways improvements.

Vertical reciprocating type, single and double cylinders, compound and triple expansion, 3 to 1000 hp.

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Stronger gauge for gauge than any other type. Light weight. Low initial cost. Easy to handle or move. Stout and rigid. Smooth, full-flow interior. Available in steel or Armco Ingot Iron. Write for Catalog.

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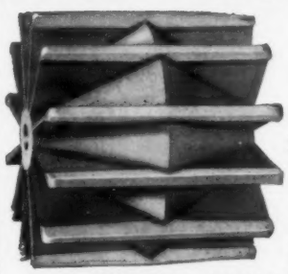

and Elevator Belts *with* SPROUT-WALDRON Wing Pulleys

Interchangeable with standard pulleys. Nothing can lodge between belt and pulley.

SPROUT, WALDRON & CO. INC.
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Elevating, Conveying and Transmission Equipment

SYMONS
VIBRATING SCREENS
and
CONE CRUSHERS

Especially adapted for producing better crushed and graded materials in greater capacity at less cost.

NORDBERG MFG. CO.
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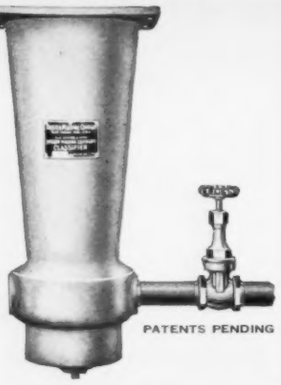
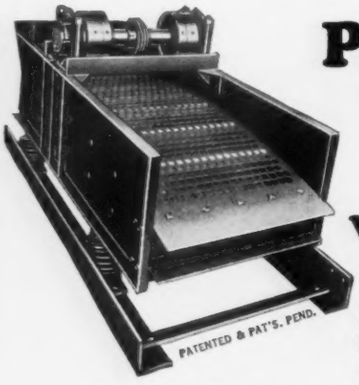
COMPOUND FUNNEL CLASSIFIER

For sizing minus 5/16" gravel and sand, and for cleaning it by washing out silt and other light impurities.

Descriptive Bulletin No. 23





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Improved Heavy Duty

VIBRATING SCREEN

Built in all standard sizes and in from one to three decks.

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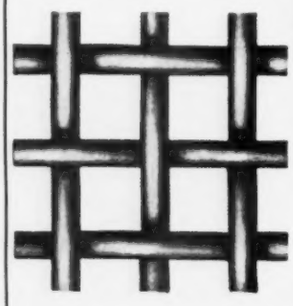
Ryerson Abrasion Resisting Sheets and Plates Last Longer

This new type of steel resists wear many times longer than ordinary steel. Write for complete data—also stock list showing steel of every kind, shape, and size. Immediate shipment assured. Joseph T. Ryerson & Son, Inc., Chicago, Cincinnati, Milwaukee, Boston, Detroit, Philadelphia, Cleveland, Buffalo, St. Louis, Jersey City.

RYERSON STEEL



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Tough and Economical

Made of a special Spring Steel Wire to resist extreme abrasion and withstand severe vibration.

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Unique principle of hydrosealing both sides of the impeller against abrasive wear, cuts maintenance to a fraction and saves ½ in power costs in pumping sand, gravel, rock and other abrasive materials—Estimated economies guaranteed. Sizes 2" to 22", pulley or motor drive. Descriptive Catalog sent on request.

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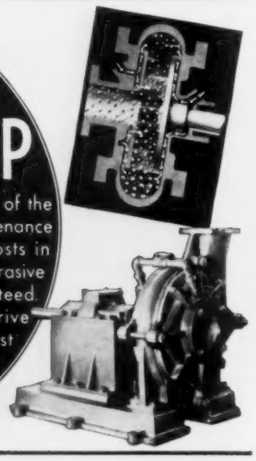

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SUPER DRY PANS—For especially large tonnages.

WASHERS AND SCRUBBERS—Steel log Washers; scrubbers, cylinder washers, sand drags and washing screens.

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For Trucks — Shovels — Crushers
Compressors—Pumps—Drills, etc.

Deliver MAXIMUM Power at MINIMUM Cost

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The Leader in Diesel Engineering Advancement
SALES AND SERVICE FROM COAST TO COAST

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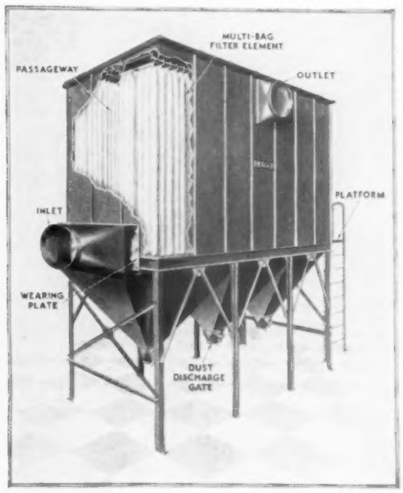
Pays LARGE Dividends

Many companies have found it CHEAPER to install Dust Control equipment than to do without. The savings are reflected in,—(1) increased efficiency of operation; (2) longer life and less maintenance of equipment; (3) health of workers; (4) fewer law suits. Dust Control problems are often complicated and can only be solved effectively by an organization with many years of practical experience back of it. You may have the benefit of our 20 years' experience.

THERE ARE NO FRAMES OR SCREENS



The New DRACCO MULTI-BAG FILTER was designed to supply the demand for a Low Cost EFFICIENT Filter. The construction of the Multiple Filter Bags contributes so much to High Dust Collecting Efficiency and also to LOW initial and maintenance cost. The Filter Bags are made of cloth and will give many years of uninterrupted service. If occasional replacement is necessary the cost is low because Bags are not expensive and one man makes the change easily and quickly on the CLEAN AIR side of Filter. There are NO FRAMES or SCREENS in the New DRACCO MULTI-BAG FILTER.

WRITE FOR BULLETIN NO. 301

DRACCO CORPORATION
Successors to The Dust Recovering & Conveying Co.
4069 E. 116th St. Cleveland, Ohio

WEAR RESISTER

- **Protects vital parts from wear**
- **Prolongs pump life**
- **Reduces repair costs**
- **Eliminates costly shutdowns**
- **Increases production**

The Wear Resister is the most far-reaching development in dredge pump history—it stops destructive abrasion and gives to Diamond Dredge Pumps a new record of service. It also may be applied to your present pump—let P.M. Co. engineers show you how. Write for Bulletin of the "Wear Resister."

PRODUCTS OF P.M. CO.

Pump Parts:	Dipper Parts:
Shells	Fronts) Black
Impellers	Lips) Patent
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Pumps Complete (Wear Resister) — Dipper Teeth — Dippers Complete—Crusher Parts—Screen Plates.

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TRADE MARK REG. U.S. PAT. OFFICE
STEEL BELT LACING
NEARLY a thousand belts per hour are laced with Alligator Steel Belt Lacing, day in day out, year in year out. Easy, rapid application with a hammer as the only tool; the hammer-clinched, vise-like grip on the belt ends, preventing friction of the plies; the patented, sectional, steel rocker pin which absorbs friction in the hinged joint; the great surplus of strength and long service—only Alligator Steel Belt Lacing combines these features which make it the choice of millions of belt users. Smooth on both sides. Easily separable. Reliable both on light and heavy duty drives. Eleven sizes. Made also in Monel Metal. Sold at wholesale and retail throughout the world.
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30" McCully Gyratory Crusher AC Motor.
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10x20, 11x36, 24x36 Jaw Crushers.
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84"x70', 56"x40' Direct Heat Rotary Dryers.
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2—24" Dings type B, Magnetic Separators.
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110', 250', 310' Portable Compressors.
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JAW CRUSHERS — 7"x11" - 8"x14" - 9"x15" - 6"x20" - 11"x22" - 12"x24" - 13"x30" - 15"x30" - 18"x36" - 20"x50" - 28"x36" - 30"x30" - 26"x42" - 36"x48" - 42"x60" - 56"x72" 36"x60" - 66"x84" - 42"x40".
Crushing Rolls—16"x10" up to 54"x64".
Gyratory Crushers—From No. 2 up to No. 12.
No. 0-No. 1 and No. 2 ring roll mill.
No. 1—No. 1½ and No. 2 rotary fine crushers.
Swing hammer mills.
3'x25'-4'x30'-5'x50'-5½'x40'-6'x50' direct heat rotary dryers.
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Rotary cement kilns from 3' to 8' diameter.
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One 6'x8' Traylor ball mill.
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Tube mills from 4' to 7' in diameter.
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Complete asphalt mixing and drying plants.

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1—Sturtevant No. 1 Ring Roll Mill.
4—Gates Gyratory Crushers No. 3D, No. 6D.
5—Traylor Crushing Rolls, 42x18", 36x16".
3—Raymond Mills, two roll, four roll, five roll.
6—No. 0000, No. 00, No. 1 Raymond Mills.
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Cotton Woven Belting

20,000 ft. NEW Belting in original rolls, size 30" to 8" widths, 100 to 500 ft. lengths, Medium and Heavy weights. Suitable for Conveyor or Transmission. For Sale at 50% of its original manufacturing price. Send for itemized list of sizes, quantities and prices.

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Several Jaw Crushers.
Gas and Electric Motors, 1 HP to 200 HP.
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☐Barges, steel
☐Belt dressing
☐Belt fasteners
☐Belting, conveyor and elevator
☐Belting, transmission
☐Belt lacing
☐Belt plates
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☐Buckets, Conveyor and Elevator
☐Buckets, Dragline
☐Buckets, Orange Peel
☐Cableways, Slackline
☐Calcining Machinery
☐Car Dumpers
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☐Cranes, Truck
☐Crushers, Cone
☐Crushers, Disc
☐Crushers, Gyratory
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☐Dryers, Sand and Gravel
☐Dust Collecting Systems
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☐Engines, Oil
☐Feeders
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☐Hoists, Drum
☐Hoists, Motor Truck Body
☐Hoists, Skip
☐Hose, Air Steam, Water
☐Hose, Sand Suction
☐Hydrators
☐Kettles, Calcining
☐Kilns, Rotary
☐Kilns, Vertical
☐Linings, Kiln
☐Loaders, Portable
☐Loaders and Unloaders, Box Car
☐Locomotives, Diesel
☐Locomotives, Gasoline
☐Locomotives, Steam
☐Log Washers
☐Measuring Devices
☐Mills, Compartment
☐Mills, Tube
☐Mixers, Plaster
☐Motors, Electric
☐Motors, Gasoline
☐Motor Trucks
☐Motor Trucks, Ready-Mixed Concrete
☐Nozzles, Hydraulic Mining
☐Nozzles, Gravel Washing
☐Nozzles, Spray
☐Nozzles, Dust Settling
☐Nozzles, Suction Hose
☐Nuggets, Grinding Perforated Metal
☐Poidometers
☐Pulleys, Clutch
☐Pulleys, Magnetic
☐Pulverized Fuel Systems
☐Pulverizers, Ball, Conical, Pebble
☐Pulverizers, Disc
☐Pulverizers, Hammer
☐Pulverizers, Ring
☐Pulverizers, Rod
☐Pulverizers, Roll
☐Pumps, Centrifugal
☐Pumps, Deep Well
☐Pumps, Sand and Gravel
☐Pumps, Slurry
☐Pumps, Steam
☐Radiators, Engine Cooling
☐Rails
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☐Rollers, Conveyor
☐Rolls, Crushing
☐Rope, Wire
☐Safety Appliances
☐Sand-Lime-Brick Machinery
☐Scales, Track
☐Scales, Truck
☐Scrapers, Dragline
☐Screens, Revolving
☐Screens, Shaking
☐Screens, Vibrating
☐Separators, Air
☐Separators, Dry Centrifugal
☐Separators, Magnetic
☐Shovels, Gasoline
☐Shovels, Steam
☐Skips
☐Sleeves, Dredge
☐Slugs and Nuggets, Grinding
☐Speed Reducers and Gears
☐Spray Nozzles
☐Sprays, Paint
☐Sprockets
☐Steel, Tool
☐Stokers
☐Switches, Track
☐Tanks, Concrete and Steel
☐Tanks, Sand Settling
☐Tanks, Wood
☐Thickeners, Slurry
☐Track, Portable
☐Track Shifters
☐Tractors, Crawler
☐Tramways, Aerial
☐Trippers, Belt
☐Trippers, Tramway
☐Unloaders
☐Valves, Pump
☐Washers and Scrubbers, Sand, Gravel, Stone
☐Weighters, Automatic
☐Welding Supplies
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☐Winches
☐Wire Cloth
☐Wire Cloth, Manganese Steel

To be used for.....

Firm Name..... *Individual*.....

Address..... *City*..... *State*.....

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We
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- Buy
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- All Makes
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Electric Motors, Pumps, Air Compressors Big Bargains. All Standard Makes.

Always Dependable Economical

Money-Back Guarantee

GREGORY ELEC. CO.
1603 S. Lincoln St., Chicago

MOTORS—3 PH., 60 CY.

Hp.	Type	Speed
800	G. E. sl. rg.	720
600	G. E. syn.	860
2-600	G. E. sl. rg.	252
600	G. E. syn.	257
600	Al. Ch. syn.	240
3-675	Al. Ch. syn.	900
400	West. sl. rg.	514
400	Al. Ch. syn.	300
300	Al. Ch. sl. rg.	585
260	Al. Ch. syn.	720
250	West. sl. rg.	720
200	G. E. sl. rg.	1200
200	West. sl. rg.	600
200	F. M. sl. rg.	600
150	G. E. sl. rg.	1750
150	G. E. sq. c.	1750
100	Cr. Wh. syn.	225

ENGINE GENER.
1-400 kvs., Cr. Wh., 240 v., 3 ph., 60 cy., 120 r.p.m. to Hamilton Corliss Engine.

MOTOR GENER.
1-750 kw. G. E. MPC., 250 v., D.C. Gener. to 1100 hp. G. E., ATI, synch. motor, 2200-3-60-900 r.p.m.

CENTRIF. PUMPS
3-14,000 G.P.M., 150' Head dir. conn., 675 hp. Al. Ch. 900 r.p.m. syn. motors.
1-14,000 G.P.M., 60' Hd., dir. conn. 260 hp., Al. Ch. 720 r.p.m.

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153 W. 18TH ST., NEW YORK CITY
REBUILT GUARANTEED

1—25 ton Ohio Loco. Crane, 50' boom. ASME boiler.
1—Vulcan 40 ton Std. Ga. Saddle Tank Locomotive.
1—Baldwin 75 ton 6 wheel Switcher (Oil Burner).
1—Marion 1 yd. Steam Crane, 40' boom, on cats.
1—Marion 15 ton Gas Crane, 40' boom, fairleads.
1—Link-Belt K-2 Crane, 40' boom, 15 ton capacity.
1—Browning ⅝ yd. Shovel, 35' crane boom.
1—Loralin 75-1¼ yd. chain crowd Shovel.
1—Keystone one yard Skimmer and Trench Hoe Att.
2—Universal 7½ ton Truck Cranes.
1—Lambert 3 drum Gas Hoist with Swinger, Buda gas eng.
1—60 HP Johnson locomotive type Boiler.
2—Caterpillar 60's with Bulldozers.
1—Sullivan 310' portable gas Compressor.
1—Chgo. Pneu. 220' portable gas Compressor.
2—Ingersoll-Rand 220' portable air Compressors.
6—Ingersoll-Rand Rock Drills.
2—1 yd. Insley Bottom Dump Concrete Buckets.
1—1 yd. Steubner bottom dump Concrete Bucket.
1—1 yd. Page Dragline Bucket.
1—1 yd. Blaw-Knox Clamshell Bucket.
2—1 yd. Hayward Clamshell Buckets.
1—¼ yd. Hayward Orange Peel Bucket.
1—⅝ yd. Browning Clamshell Bucket.
1—⅝ yd. Kiesler Digging Bucket.
1—⅝ yd. Owen Digging Bucket.
1—Morris 8" Dredge Pump with 150 HP G.E. motor.
1—Morris 10" Cent. Pump 2250 GPM@130' head.
1—Goulds 12" Cent. Pump with 50 HP G.E. motor.
1—Amer Well Wks 6x8" Cent. Pump 20 HP West. motor
1—Thompson 6" Self Priming Pump, Waukesha motor.
4—Humdinger Self Priming Cent. Pumps, gas motors.
1—Labour 4" Self Priming Pump.
2—Domestic 4" Self Priming Pumps.
1—Domestic double diaphragm Pump with gas motor.
1—C. H. & E. Road Pump with Gas Motor.
1—G.E. motor, 200 HP slip ring.
2—No. 7 McKiernan-Terry Hammers.
1—No. 5 McKiernan-Terry Hammer.

HARRY C. LEWIS
325 Frelinghuysen Ave. Newark, N. J.

For Sale or Rent

5 to 30-yd. Side Dump Cars.
50-ton Std. Gauge Locomotives.
1-yd. Link-Belt Cranes and Draglines.
1-yd. Northwest Shovel-Draglines.
Also general construction equipment.

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Chicago — 16 No. Clinton St.
Pittsburgh — Union Trust Bldg.

FOR SALE

Sauerman 1-yard Crescent Power Scraper.
Ingersoll-Rand 9x8 ER-1 Air Compressor.
Reliance 8"x14" Fine Jaw Crusher.
Portable 24" Gauge Track and Cars.
Belt Conveyor, 24"x100 ft.
Link-Belt 50' Chain Elevator, 12x7 buckets.
La-Dal double Deck 3'x6' Vibrating Screen.
Owen ¾-yard Clamshell Bucket.
16", 20" & 26" Belt Idlers & End Pulleys.

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FOR SALE: 2", 1⅞, 1½, 1¼, 1⅛ and 1" IMPROVED BLOW STEEL and PLOW STEEL wire ropes, hemp and WIRE CENTERS; NEW and slightly used, but practically new; 300 to 3500 ft. lengths; adapted for DRAG LINES, Dredging, cableways, etc.; 60,000 ft. 1" and ⅞ Extra Strong, for GUYS, etc.; 200, 150, 100 and 60 H.P. Diesel Oil Engines, horizontal and vertical Type, with or without alterators; 1¼ yard Caterpillar Gas Cranes and shovels; CHEAP. PHOENIX CONTRACT CO., Winne Bldg., Wichita, Kansas.

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16—3½ cu. yd. "REX" Moto Mixers
Used on one job only—S. F.-Oakland Bay Bridge as Marine Mixers, and

All Completely Rebuilt With

New Motor (Waukesha)
New Clutch
New Gear Case Gears
New Discharge Chute & Handwheel
New Control Mechanism

6—Available for immediate shipment balance 2-3 wks. delivery.

Substantial Saving Prices

on this same as new equipment
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OUTER HARBOR — OAKLAND, CALIF.

BRAND NEW ¾ YARD CLAMSHELL DIGGING BUCKETS

We have seven (7) of these for immediate sale. Made by "Lakewood", shells drilled for teeth. Our price $350.00 each, F. O. B. N. Y. C. (New price, $813.00.) You can inspect one at our show rooms.

De Witt Tool Company
252 Lafayette St. — New York, N. Y.
Phone Ca. 6-6640

FOR SALE

Erie ¾ Yd. Steam Shovel on Cats.
8 Ton Plymouth Std. Ga. Gas Locomotive.
5 Ton 48" Ga. Plymouth Gas Locomotive.
19 Easton 4 Yd. End Dump 48" Ga. Quarry Cars.
5" High Pressure Pump.
30 & 60 Caterpillar Tractors.
19 K & J 16 Yd. Std. Ga. Air Dump Cars.
2 Late Type Jordan Air Operated Spreaders.
1 Std. Ga. Nordberg Track Shifter.
175 Bucyrus Shovel, 5 Yd. Dipper.
856' Sullivan Ang. Cpd. Air Compressor with 152 Hp. 220 V. A.C. Motor Belted.
Derricks, Boilers, Engines, Locomotives, Gravel Plants, Road Rollers, Forms, Finishers, Oil Engines, Motors.
TELL US WHAT YOU WANT TO BUY.

The T. J. Lane Company
Springfield, Ohio

LOCOMOTIVE CRANES

1 Browning Standard Gauge, 38' Lattice, Steel Boom, Capacity 5,000 pounds, 40' Radius
1 McMyler Standard Gauge, 40' Lattice, Steel Boom, with 1½ Yard Clam Shell Bucket
1 Dickson (American Locomotive) 30-ton Saddle Tank Switching Engine, Standard Gauge
All Excellent Condition

PERCY M. BROTHERHOOD & SON
114-118 Liberty St., New York City

WE BUY AND SELL

Power Plants, D.C. and A.C. Motors, Generators, Transformers, Pumps and Elec. Instruments. Give us this opportunity of bidding. NOTE: We carry a diversified stock, and your inquiries will receive immediate attention. Satisfaction guaranteed.

SUPERIOR ELECTRIC MACHINERY CO.
253 North Third Street — Philadelphia, Pa.

VALUE!

GOOD USED EQUIPMENT

Selected Special Items

1—No. 37 Marion Electric Shovel.
1—No. 1260 Jeffrey Bakstad Jaw Crusher.
1—8'8"x85' Ruggles-Coles Class A Rotary Dryer.
2—5'x26' Ruggles-Coles Rotary Dryers.
1—5-roll Raymond high side Mill.
2—3-roll Raymond high side Mills.
3—5'x50' Allis-Chalmers Rotary Dryers.
1—8'x125' Rotary Kiln.
5—6'x6"x60' Vulcan Rotary Kilns.
1—3'x25' Bonnot Rotary Dryer—Kiln.
1—8'x12' Oliver Rotary Filter.
1—12' Gayco Air Classifier.
5—5'x22' Gates iron lined Tube Mills.
1—7"x24" Sturtevant Jaw Crusher, to ½".
1—36"x24" Jeffrey type D Hammer Mill.
1—36"x36" Gruendler Hammer Mill, roller bearing.
1—7' Symons Cone Crusher.
2—20x14, 36x16 Sturtevant Crushing Rolls.
1—30x10 Colorado Iron Works Crushing Roll.
1—24"x72" Magnetic Pulley, complete.
6—Hardinge Ball Mills, 4½x16, 6x22, 6x36, 7x36, 8x22, 8x30.
1—3'x12' Hendy iron lined Tube Mill.
2—6'x45' Rotary Dryers—MONEL LINED.
8—3x5, 4x5, 4x7 Tyler Screens.
1—4'x8' Rotex Screen, single deck.

Some of the Items Remaining at the Manganese Plant, Cartersville, Ga.
Refer to Our Ad in May Issue

30—GE Motors, all 3 hp., 60 cy., 2200 v.: 400 hp. Syn., 200 hp. Syn., 200 hp. S.R., Sq. Cage, 150 hp. S.R., 100 hp. S.R.; 75, 50, 40 hp., Sq. Cage.
16—Multi-stage Dayton-Dowd hydraulically balanced bronze fitted Centrifugal Pumps, 578' to 116' head, each with direct connected 3/60/2200 motor; 4000 to 750 GPM.
1—Apron Feeder, 5'3" C/C, 60" wide, with motor and reducer.
1—205' 20" Conveyor, motor, reducer.
1—48" C/C Bucket Elevator, 14" buckets, 3/32" rubber covered belt, with motor and reducer.
1—220' Gardner-Denver portable Gasoline Compressor.
1—250-ton steel structural Bin, two sec.
1—¾ yd. Thew Crawler Gasoline Shovel.
2—Shepard-Niles Traveling Cranes, 20-ton, 30' span—10-ton, 24' span, hand chain operated.
1—30-ton Plymouth Gasoline Locomotive.
1—27"x15' Dorr Classifier.
2—Dorr Bowl and Rake Classifiers, 20' bowls, 6'x33'4" rakes.
9—Jigs, Allis-Chalmers, Woodbury, with 5 hp. var. speed motors. Texrope drives.
4—Fahrenwald Classifiers, 5-pocket.
4—Dodge Sand Dewaterers, capacity 120 t.p.h.
1—16' Allis-Chalmers Log Washer.
2—25' Allis-Chalmers Log Washers.
9—50-ton Steel Ore Cars, drop bottom.
8—6" Georgia Iron Works Dredge Pumps.
3—4'x5' No. 37 Tyler Screens, 2-deck.
1—Ruth Laboratory Rod Mill.
1—Main structural Steel Building, corrugated steel roofing and siding. Approx. 400-tons, 106'x140', 3 floors.
2—Heavy structural Steel Buildings, as above, each 40'x50', 2 story.
5—Buildings, wood and steel frame, corrug. siding.
Write for details.

SEND FOR COMPLETE BULLETIN

containing details and photographs of equipment at this plant; also, our regular stock of Crushers; Vibrating Screens; Ball, Rod, and Tube Mills; Air Compressors; Rotary Kilns and Dryers; Hardinge Ball and Pebble Mills; Raymond and other Pulverizers; Air Classifiers; Thickeners; Wet Classifiers; Filter Presses; Continuous Filters; etc.

CONSOLIDATED PRODUCTS COMPANY, INC.
17-19 Park Row, N. Y. C.
Cable: Equipment

ELECTRICAL MACHINERY

Motors and Generators, A.C. and D.C. for sale at attractive prices. New and Rebuilt. All fully guaranteed. Write for List and Prices.

V. M. NUSSBAUM & CO.
FORT WAYNE, IND.

Bushings—Spacers—Tubes —Sleeves Straight or V Seam For Light and Heavy Machinery. If a Split Tube will do (it probably will).

Tell us how it is used, and we can make it.

Gifford Engine Company
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511 Eleventh Street, N. W.
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For Sale—A Good Time To Buy

1 conveyor steel, 229 ft. centers.
1 bucket elevator steel, 117 ft. centers.
1 unloading bridge, 275 TPH, 400 ft. span.
½ yd. Sauerman dragline cableway, 600 ft.
McCully gyratories 42″ and 36″.
12″ cent. sand and gravel pump with motor.
Ready mix concrete plant Ransome 56S.
Cummer 3000 yd. car type asphalt plant.

A. V. Konsberg, 111 W. Jackson Blvd., Chicago.

RAILS

20, 25, 30, 35, 40, 45, 50 and 60 lb. sections, practically as good as new. Also portable track and all gauges of contractors "V" shaped and Western cars carried in our centrally located storage warehouses. Wire or write for prices.

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480 Lexington Ave., New York City — P. O. Box 1234, Pittsburgh, Pa.

GASOLINE LOCOMOTIVES

36″ Gauge

1—Milwaukee, 7 Ton, Model H4B, Ser. No. 800, driven by a Hercules Engine, Model OX, $700.00.
4—Vulcan Iron Works, 4 Ton, Class AW-4, driven by Hercules Engines, Model OX, $500.00 Each.
8—Flat Cars, 36″ Gauge, Steel Construction, 96½″ x 49″, wooden platform, $50.00 Each.
Equipment New 1927—A-No. 1 Condition.

SUPERIOR ELECTRIC MACHINERY COMPANY
253 N. 3rd Street — Philadelphia, Pa.

Steam Driven Air Compressors

One Ingersoll Rand 2,000 foot, Class Type No. 10
One Ingersoll Rand 1,800 foot, Class Imperial No. 10
One Bury 500 foot, Class C C 5
One Ingersoll Rand Class H 500
All excellent condition.

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HOFFMAN BROS. DRILLING COMPANY
PUNXSUTAWNEY, PA.

We drill for any mineral. We have more than forty steam, electric and gasoline drills, adapted for any job. Satisfactory cores guaranteed. Our prices are right.

Established 1902 - - - - - Telephone No. 382

FOR SALE

1—300 HP Primms Diesel engine with 200 KW generator, complete outfit.....$1500.00
1—50-ton Porter Locomotive..... 1000.00
1 Lot—6-yd. Koppel steel frame and steel lined cars in first class condition. Each.....$100.00
In lots of 6, each..... 90.00

THE W. T. WALSH EQUIPMENT CO.
3088 West 106th St. — Cleveland, Ohio

FOR SALE

1—75-B Lorain Gas Shovel 1¼-yd. new late 1931.
1—20-ton cap. P. & H. Gas Crane, 60′ Bm, used 4 mos.
1—12-ton std. ga. Whitcomb Gas Locomotive new 1935.
1—Kennedy No. 49 Ball Bearing Reduction Crusher used 4 mos.

Grey Steel Products Co., Inc.
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WE LOOK INTO THE EARTH

By using Diamond Core Drills We drill for Limestone, Gypsum, Talc. Fire Clay. Coal, and all other minerals.

PENNSYLVANIA DRILLING CO.
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Low Cost Air

1000 ft. Fairbanks Morse Diesel Driven Sullivan Compressors—Modern—Like New.

MISSISSIPPI VALLEY EQUIPMENT CO.
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Compressors, Diesels, Crushers, Generators, Derricks, Hoists, Cableways, Cranes, Etc.

FOR SALE

480 Marion Steam Shovel
Equipped with steam dipper trip
2 Cu. Yd. Bucket. A1 Condition.

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DIAMOND CORE DRILLING

CONTRACTORS
FIRECLAY, ASPHALT, LIMESTONE, COAL AND ALL MINERALS
Light Gasoline Outfits

MOTT CORE DRILLING COMPANY
HUNTINGTON, W. VA.

DIESEL ENGINE

200 HP. DeLaVergne Full Diesel Oil Engine, most efficient speed 164 RPM. giving 166 HP. Sgl. Cyl. Horizontal. Never installed. Wt. 90,000 lbs. New Price over $12,000. Our Price one-third of New Price.

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New and Rebuilt—very large assortment of all electrical equipment—bought, sold and rented.

We Satisfy

Wexler Electric Motor Company, Inc.
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BOILER WANTED

For Bucyrus-Erie Model 20-B Steam Shovel No. 3986. Must be in good condition.

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Over 10,000 items in stock for immediate delivery—Rochester, N. Y., or Toledo, Ohio, shipment. Rebuilt equipment sold with standard new guarantee. We buy used equipment—25 and 60 cycle—send us your offerings.

BERGER BROS. ELECTRIC MOTORS, INC.
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Phone Monroe 2094

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Wisconsin Silica Sand Plant. For Sale. Exceptional Opportunity. Complete Bldgs. and Equip. Hydraulic Pumps, Pebble Mills, Crushers, Screens, Etc. Switch Track. Good Deposit. Long Royalty Lease. Address Box 506, Pit and Quarry Publications, 538 S. Clark St., Chicago.

WANTED

Two Sauerman bottomless dragline buckets, half to one yard capacity, also one of two to two and half yards.

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Rosedale — **Miss.**

FOR SALE OR RENT

Link Belt K-25 ¾ Yard Gas Crane.
General ½ Yard Gas Crane.
Mundy D.D. Hoist, 40 HP Elec. A.C.
Mundy D.D. Hoist, 15 HP Elec. A.C.
O & S D.D. Hoist, 40 HP Elec. A.C.
Two—75B Lorain Gas Cranes 50′ Booms.
One—220′ Metaweld Portable Compresor.
One—330′ Metaweld Portable Compressor.
Will Sacrifice.

R. H. BOYER, P. O. Box 2, Upper Darby, Pa.

FOR SALE

Thirty-six inch belt. Six ply, one-eighth top and one-sixteenth bottom. Is in very good shape. One piece 275 feet long and one piece 100 feet long. Will sell for $1.50 per foot F. O. B. plant.

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WANTED

Second-hand Portable Gravel and Sand Plant, crushing and screening, good working condition, prefer capacity 60 to 75 tons per hour.

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For Sale Cheap

New Blaw Knox Clamshell Buckets. Heavy Duty Dreadnaught.
½ and 1 yd. Digging Type, with teeth and counterweights.
¾ and 1 yd. Rehandling Type.
Also lips, teeth, etc.

THOMAS DOYLE
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MISCELLANEOUS BARGAINS

Cement Block Machine and Plant, complete with power. Sauerman Drag Scraper Outfits, complete: ½ to 6 yds. Sauerman Slackline Excavator Outfits, ¼ to 2½ yds. Universal Truckcrane, inc. ½ yd. bucket, $1500. Universal ¾ yd. Shovel. Also General comb. ½ yd. 45′ lattice Boom for Northwest; fairleads. Drum fairleads, and Shovel Attachment for P&H 206, etc. Draglines—Electric, Gas., and Diesel—½ to 8 yds. Crushers and Portable plants, Screens, Conveyors.

James Wood, 53 West Jackson Blvd., Chicago, Ill.

WANTED

One 36″ x 36″ single roll Jeffrey crusher.
One 4′ x 8′ two deck mechanical vibrating screen.

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FOR SALE

Complete Assortment New Detachable Bits and Drill Steels.

Attractive Prices

R. E. BROOKS COMPANY
30 CHURCH ST. — **NEW YORK, N. Y.**

FOR SALE

Marion Gas-Electric ¾ yard Shovel.
Osgood 1-yard gas crawler shovel, overhauled.
Locomotives: 75-ton switcher code boiler; also saddle tank type, narrow and standard gauge.
CARS: side dump 12-yard; 50-ton steel twin hopper cars, etc.

SOUTHERN IRON & EQUIPMENT CO.
Atlanta, Ga.

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½ yd. Gasoline Crane.

Must be reasonable.

Address Box 515, Pit and Quarry Publications, 538 South Clark Street, Chicago.

"E. C. A. REBUILT" QUARRY AND GRAVEL PLANT EQUIPMENT

AIR COMPRESSORS

Portable and stationary, belt, with elec. or gas. power, sizes from 21 cu.ft. to 1000 cu.ft.

BUCKETS

246—Buckets, all sizes and makes.

CARS

Large lot including std. ga. 6 and 12-yd. and 20-yd., 36-ga. 5 yd. and 24-ga. 1½-yd. Also std. ga. flat cars and ballast cars.

48—Koppel Quarry cars 42" ga. 2½ yd. One way side dump.

CONVEYORS and ELEVATORS

9—Port Belt Conveyors with steel frame, gas or elec. pr. 18 and 24 in. Barber Greene and Chic. Automatic.

1—Stationary: Barber-Greene 18"x 100'.

11—Bucket elevators; 6 Chain Belt Co. and Weller and Link Belt vertical enclosed type; capacities from 35 to 117 tons per hour. 5—Weller inclined type Nos. 3, 4, 5 and 6 up to 170 yds. per hr.

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5—Locomotive cranes; sta. ga. 30 and 25-tons; Ohio, Browning, American, Industrial.

1—American 15 ton gasoline powered locomotive crane on 8 wh. MCB trucks, 50 ft. boom. Model 158-G.

CRANES and DRAGLINES

1—Link-Belt K-55, Ser. 1450 comb. shovel and dragline, 70-ft. boom, 2 yd. Page bucket.

1—Northwest No. 5, Ser. No. 3430, 50 ft. boom, 1¼-yd. dragline or clamshell; 130 HP 6 cyl. Wisconsin accelerated control engine.

1—Osgood heavy duty gas crane, No. 2054, 40-ft. boom, 1-yd. bucket.

6—1-yd. gasoline crawler type cranes. Northwest, Link Belt, P & H, Brownhoist.

3—½-yd. Gasoline crawler cranes. Northwest, Brownhoist and Thew.

CRUSHERS AND SCREENS

1—Symons coarse cone crusher, size No. 5½, SU No. 521; capacity 450 tons per hour of 2½" material—130 tons per hour of ½" material; weight 85,000 lbs.

1—Set Power and Mining Machinery Co. crushing rolls, size 42 in. x 16 in., rated capacity 15-20 tons per hour of ⅜" material; weight 41,000 lbs.

1—No. 6 Champion jaw crusher, No. U-1075-4; jaw opening 12"x26"; capacity 24-35 tons per hour of 2" material; weight 20,000 lbs. Like new.

2—No. 3 McCulley gyratory crushers; size of each opening 7"x28"; capacity 25 tons per hour of 2¾" material; 11 tons per hour of 1¼" material; weight 17,000 lbs.

SCREENS

2—Allis Chalmers roller type, all steel, heavy duty, 48 in. dia. by 24 ft. long screen in 3 sections.

2—P & M Roller type, 48 in. by 18 ft. long.

1—Allis Chalmers, roller type 51" dia. by 21 ft. long.

DERRICKS

Steel and wood, stiff leg, or guy; from 5 to 50 tons, including 3 steel stiff legs; 1—20-ton Terry 100 ft. boom; 1—10-ton Insley 80 ft. boom and 1—10-ton American, 80 ft. boom.

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3—Gardner Denver wagon or derrick drills with Model 21 or 17 Gardner drills for channelling.

25—Ingersoll-Rand and Sullivan jackhammer column and tripod drills.

HOISTS

Gasoline, electric and steam. All sizes.

LOCOMOTIVES

32—Gasoline locomotives from 14-ton to 2-ton, std. 36 and 24-ga.

1—3 ton 42" ga. Fordson.

1—24-ton Porter steam, saddle tank, cyl. 12"x16" st. ga. Serial No. 5093.

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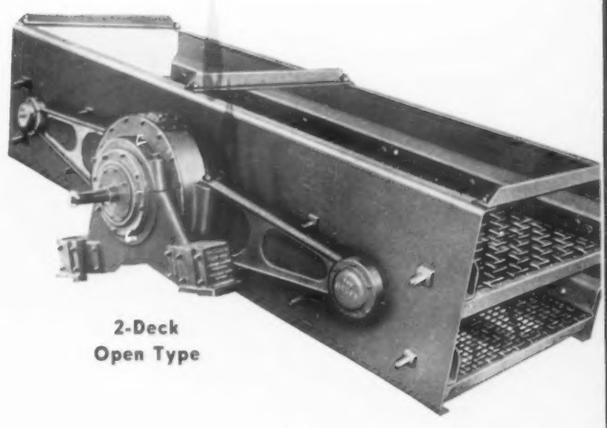

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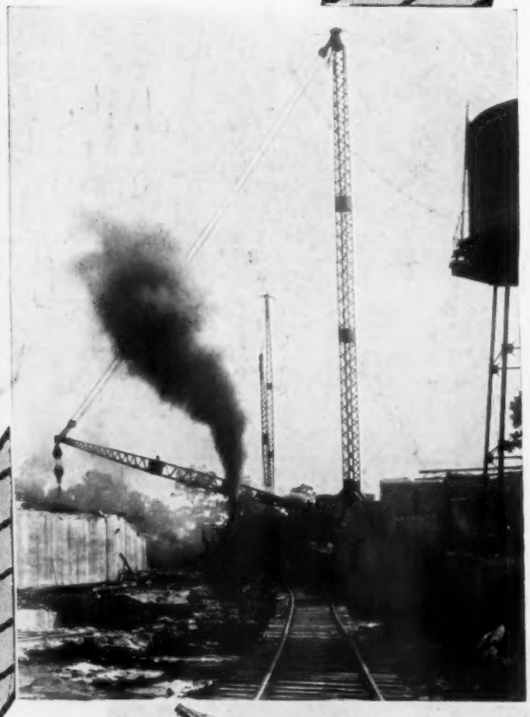

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